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2—THE IRON AGE, April 16, 1936

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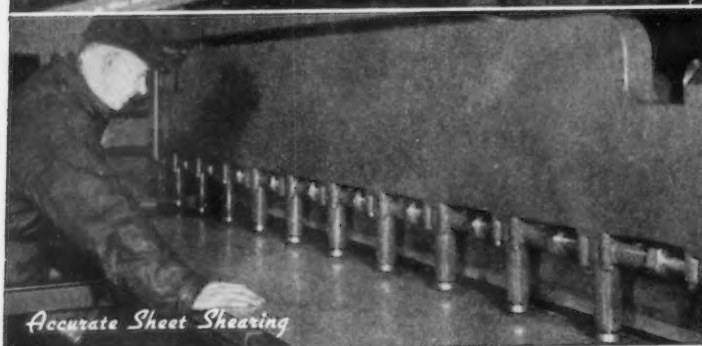
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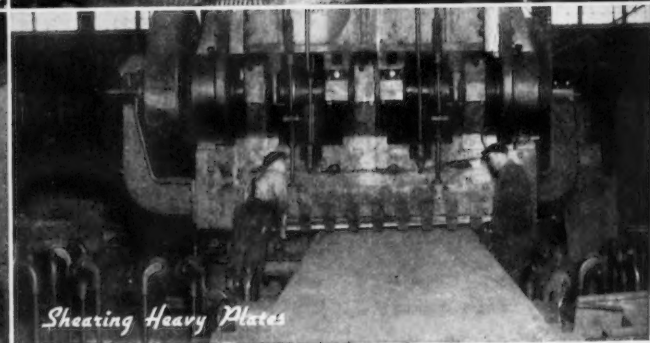
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APRIL 16, 1936

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Coloring of Metals (2) *Copper and Brass*

By HERBERT R. SIMONDS and
C. B. YOUNG

IN reviewing prospects in metal finishing, Dr. Colin G. Fink of Columbia University has said that the industry is looking forward to the development of new methods of coloring metal products, the colored film having two functions, i.e., attractive appearance and resistance to corrosion. He said that research work along this line offered much promise.

Results of some recent research work, including description of the new color-by-electrolysis process, are given in this, the second of a series of articles on various meth-

ods of coloring metals. The initial article, dealing with the coloring of iron and steel, appeared March 26. Articles to follow will describe coloring of aluminum, cadmium, chromium, nickel, tin and zinc.

Mr. Simonds is vice-president of Metal Products Exhibits, Inc., Rockefeller Center, New York. Dr. Young, associated with Dr. Colin G. Fink at Columbia University as an instructor in chemical engineering, is also technical director of the United States Research Corp., Long Island City, New York.

IN the metal-working field, copper and copper alloys have stolen a march on other metals in the matter of color association. This, perhaps, was natural inasmuch as pure copper has a rich reddish color as compared with the grey-ness of iron, zinc, tin and even aluminum. Thus it has been easy for architects and designers to turn to the copper alloys for color effects.

The use of color in the decora-

tive metal field for many years was limited largely to copper and its various alloys. In the architectural field one of these alloys, bronze, long has held first place, due partly to the ease with which various shades can be secured to match specified decorative features or to meet designers' requirements. Now, by improved technique in chemical treatment and through years of research in the field of alloys, new colors and new finishes for copper

and brass have extended the application of these metals into nearly all avenues of today's complex mechanized life.

By varying the percentage of copper and tin, bronzes may be given a range of color from red through golden yellow and blue tones to a final grayish white. Table I shows the principal bronze alloys in practical use together with the color description of each. The same information is graphically portrayed in Fig. 1. Most so-called commercial bronzes are not true bronzes in that they contain no tin but have high copper content.

Next to the bronzes come the brasses in point of color association. For instance, many new color effects in building hardware have been achieved by varying the proportions of brass alloys. Table II gives several typical brass alloys with their corresponding colors. These same data are shown graphically in Fig. 2. These range from a yellow red through the straw yellows to silver and bluish greys. The alloys consisting of copper and zinc are not always known as brass, and combinations other than those given in Table II have various uses. For example, a low-zinc high-copper alloy is known as a bronze powder, and the yellow alloy which has 20 parts zinc and 80 parts copper is known as tombac. A 50-50 combination is used as a brazing solder. Table III gives the names of some of the common copper-zinc alloys.

With the introduction of aluminum, copper realized it had a definite rival in the field of colored metal. Architects were quick to turn to the lighter effects produced by aluminum as a relief from the previous overemphasis on bronze. Some attempts were made to take the new enemy into camp and combine aluminum with copper to produce new color effects. In general these attempts have not been very successful. An exception perhaps is the case of the so-called aluminum bronze which consists of 90 parts copper and 10 parts aluminum. This alloy gives a golden yellow color, and some of its users claim certain special features. In appearance it varies but slightly from the golden yellow alloy produced with 95 per cent copper and 5 per cent tin.

Many colorful copper alloys are produced by the addition of other metals than the usual zinc and tin



METAL and glass predominate in the design of this modern room. Some designers have recommended the use of colored metal retaining strips for supporting the glass bricks.

but because of the great variety of colors obtained from the simpler brass and bronze alloys, seldom is it necessary to go to the less usual alloys for color effect alone. Mention might be made, however, of color possibilities through the use of beryllium. By varying percentages, beryllium-copper alloys may be given almost any of the gold shades from platinum through to rich red gold. In some of these it is claimed that the color so closely matches gold as to make identification of one as compared with the other very difficult.

Cuprous Oxide

Some of the colors secured through alloying copper with beryllium are not stable and protection by lacquer usually is advised.

A new subject, color by electrolysis, is receiving more and more attention and a recent paper by Jesse E. Stareck and Robert Taft describes among other things investigation of copper-plating baths. It has been found that alkaline solutions of copper lactate produce cathodic deposits at low-current density which are highly colored. Dr. Fink in abstracting the paper states: "The color of the deposit is a function of thickness or plating time. Violet, blue, green, yellow, orange and red appear successively during each cycle. The deposit appears to be primarily cuprous oxide. It is very stable, both chemically and mechanically, and can be applied to a large variety of metals. The process has been found practical and economical on a commercial basis."

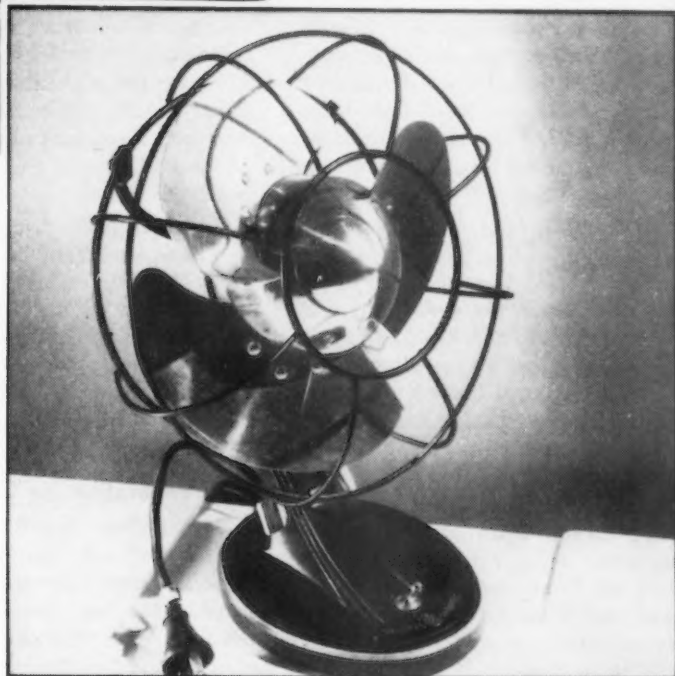


by altering the composition of the bath.

The conclusion of this paper suggests such important pending applications and is so pertinent to the present discussion that it is included here almost in full:

"Due to the properties of the deposit and their ease of reproduction, this color-by-electrolysis process should be valuable in imparting decorative finishes to metallic or conducting surfaces. It should be pointed out that not only baths such as we have described produce these colored deposits, but many alkaline baths containing copper will produce them. Thus they may be produced from Fehling's solution, from solutions containing sodium silicate and sodium hydroxide in addition to copper sulfate, from

ELECTRIC fans frequently must blend with wall decoration, in which case the base and guard are usually lacquered and the rotating element is chemically colored to match.



Plating-time is one of the chief variables. Colored deposits can be produced by electrolysis periods ranging from 1 to 10 min., the spectral colors repeating about every 20 sec. It is possible to hasten or retard this period somewhat

solutions of sugar and alkali, and from solutions of other organic salts and alkali.

"The usefulness of such deposits is by no means restricted to their decorative application. For example, the exceedingly coherent

films of cuprous oxide may be used in the production of electrolytic rectifiers, or thick films may be reduced to metallic copper, producing a form of copper of exceedingly fine grain and beauty. In these heavy deposits, which range in thickness from 0.001 to 0.005 in. (0.025 to 0.127 mm.) the color is a pigmentary one, i. e., not due to diffraction phenomena. The color of such deposits can be varied, however, by using different base metals. Thus, on iron the pigmentary deposit produces rich browns; on buffed copper, oranges and reds are formed; on bright electrolytic copper, purples and blue-grays result; and on brass the colors are rose and blood red. These reduced heavy deposits may be buffed and polished without injury and are extremely resistant to corrosion, withstanding 100 hr. exposure to the standard salt spray test without deterioration or change in color.

"The process is capable of being carried out on a commercial scale, as has been done by one of the authors (J. E. S.), and has been found to be practical and economical."

Chemical Coloring

In the previous article on coloring steel, the various processes were considered under the following four headings: heat-treating, chemical immersion, plating, and alloying. In the case of copper and brass, heat-treating plays practically no part in the color scheme. Some of the alloys are heat-treated for mechanical reasons, but in general the oxide which forms scales off easily and has a negative value of appearance. On the other hand, chemical treatment of copper and brass accounts for a large part of the color attributed to these metals, and thus many chemical processes are here described.

Perhaps the best known is artificial patina intended to give an exact duplicate of the natural weathering of exposed copper parts. The natural patina develops, depending on atmospheric conditions, in from one to two years; the artificial patina, in from one to two days. However, this artificial means is not always satisfactory and it is best to experiment with small pieces before using the process on a large scale.

The Copper and Brass Research Association has issued an addendum in connection with its previous in-

structions for the rapid development of patina on copper. Briefly this modifies the process to the following: Clean copper surface thoroughly. For this the following method is a good one except that care must be taken to avoid injury to hands or clothing: (1) Prepare a strong potash lye solution in the ratio of 1 lb. of lye to a pail of boiling water; (2) apply this with a brush, scrubbing thoroughly; (3) the surface then must be washed with clear water to remove all cleaning compounds.

If an oxide film remains, this should be removed with a 5 to 10 per cent solution of sulfuric acid applied cold and followed immediately by washing with clear water. This treatment with sulfuric acid leaves the copper in excellent condition for coloring. The actual coloring is usually secured by applying a prepared solution by spraying. The color does not appear immediately and the effect may be injured if rain falls within 6 to 8 hr. after coloring. Directions given by the association for preparing the solution are as follows:

"Dissolve the proper amount of ammonium sulphate in the water required. The solution should be complete. Then add the correct weight of copper sulphate to the above solution of ammonium sulphate. This is best done by removing a few gallons of the solution and dissolving in it as much of the copper sulphate as possible, returning this to the original volume. Repeat this procedure until all of the copper sulphate is dissolved. Then add slowly with constant stirring the required amount of concentrated ammonia to the above solution of ammonium sulphate and copper sulphate. It is especially important that the ammonia be measured exactly. The correct ratio of ammonia to water must be maintained in preparing the solution. The solution is now ready for use. Wooden barrels or tubs are advised as containers."

Plating Copper

Under the heading, plating, almost everything which was satisfactory for steel applies to the copper and brass alloys, for they are as a general rule good bases for nearly all electro-deposited coatings. It should be noted, however, that certain combinations of deposits are desirable from the standpoint of durability. Thus, if a

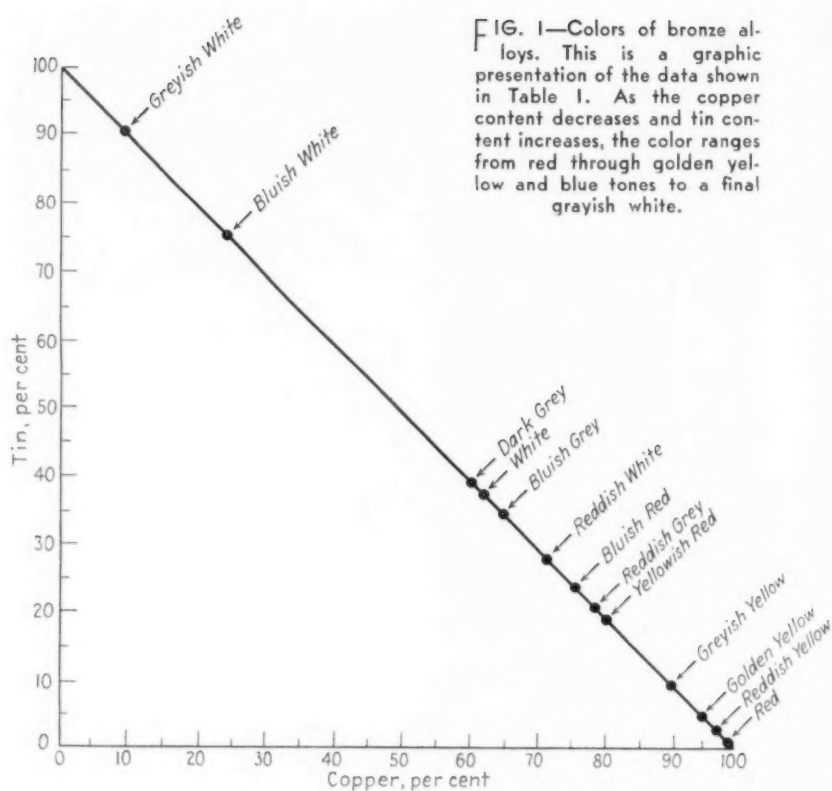


FIG. 1—Colors of bronze alloys. This is a graphic presentation of the data shown in Table I. As the copper content decreases and tin content increases, the color ranges from red through golden yellow and blue tones to a final grayish white.

chromium deposit is desired over brass, it is highly advisable that the base metal receive a coating of nickel which can be followed by chromium. If the nickel is omitted, within a few months the chromium more than likely will peel or blister.

One of the commonest examples of coloring copper found in our extensive use of metal today is in the production of cameras and kodaks. Most of these are now built with copper or copper-alloy cases which are colored black directly on the surface by chemical or electrochemical means without application of any organic coating. The usual finish on cameras is black and white nickel deposited in contrasting areas on a copper alloy case. Both of these nickel plates were described in the first article in this series, which appeared March 26 in *THE IRON AGE*.

The alloying of different metals to form alloys with a copper base is perhaps as important as the chemical means of securing different color effects, and, as already suggested, a whole gamut of interesting colors may be secured in the multitudinous alloys of copper.

A close approach to pure gold appearance is obtained with one of the alloys previously mentioned,

aluminum bronze. This alloy contains 90 to 93 per cent copper and 7 to 10 per cent aluminum, with minor modifications, and generally less than 1 per cent of one or more of the following elements: gold, iron, and nickel.

Color variations from gold-yellow to copper-red can be secured on brass by immersing parts to be treated in a boiling solution made up of $\frac{1}{2}$ oz. cream of tartar in 1 gal. hot water to which is added from $1\frac{1}{2}$ to 2 oz. of hydrochloric acid and a like amount of pulverized antimony.

Preparation for Coloring

In coloring copper and copper alloys, thorough cleaning is necessarily a prime prerequisite, and efficient cleaning frequently takes the form of a light acid etching or of a pickling operation. A few of the common pickling solutions are therefore included here.

Nitric acid dip:

200 parts by weight of 52 per cent nitric acid (sp. gr. equals 1.33).
1 to 2 parts of common salt.

Sulphuric acid dip:

Add $\frac{1}{2}$ gal. vitriol (75 per cent H_2SO_4 ; sp. gr. equals 1.7) to 100 gal. water.

Sulphuric-chromic acid pickle:

7 lb. potassium or sodium bichromate

should be dissolved in 10 gal. water; then add 1 gal. (17 lb.) vitriol (75 per cent H_2SO_4 ; sp. gr. equals 1.7).

A marked difference in surface effect is dependent upon the actual technique of dipping. A matt finish is secured by heating the bath or by slowing up the time of immersion. For bright effects, dry parts are immersed for a fraction of a minute and then quickly washed in plenty of clean water. To prevent tarnish of bright dipped articles some manufacturers use a final dip (after washing) in a weak solution of argol or tartaric acid.

For convenience, some of the many chemical means of coloring copper and copper alloys will be grouped under a few of the predominant colors. These are as follows:

Black Finishes

One typical means of producing a black on copper is to use a solution containing 2 oz. of potassium sulfide (liver of sulfur (K_2S) per gal. and 32 oz. of ammonium chloride per gal. This solution is unheated and the articles are immersed for a few minutes, rinsed first in cold water then in hot water, and, if the size permits, they are then tumbled in sawdust. A

variation of this same process using barium sulfide (BaS) in place of the potassium sulfide (K_2S) produces a brown on copper.

A black shade on brass is being commercially produced by a solution of copper sulphate ($CuSO_4 \cdot 5H_2O$) 4 oz. per gal. with ammonium hydroxide (NH_4OH) added until the green precipitate of copper hydroxide nearly disappears. It is important not to have an excess of ammonia, and a slight precipitate left is a protection against this. The well-cleaned articles are immersed in the solution which is heated to 200 deg. for 5 to 10 sec., then rinsed in cold and hot water, after which they are immersed in a solution containing $2\frac{1}{2}$ oz. of sodium hydroxide ($NaOH$) per gal. This solution has the effect of fixing the color. After the above has been accomplished the usual processes of rinsing and sawdust-drying may be employed. Brass parts blackened by the above method are usually lacquered afterwards for protection.

Brass may be given a good black finish by immersion in a bath made up from a mixture of two solutions. The first solution is made by dissolving 1 qt. aqua ammonia (26 deg.) in 16 oz. of dry copper car-

bonate. The second solution is made by mixing 3 oz. soda ash in 2 gal. of water at 160 deg. F. These two solutions are mixed thoroughly and are then ready to use as a coloring bath. The parts are immersed for from 1 to 3 min. or until the desired black finish is secured. They are then removed and washed in cold and later in boiling water. With this method, as with most other chemical methods of coloring copper alloys, final drying by tumbling with sawdust is recommended when the nature of the work permits.

Another formula for a bath to produce black finish on brass is copper carbonate 16 oz., ammonium hydroxide 64 oz., and water 1 gal. This solution is used at 175 deg. F. Some manufacturers use a boiling solution composed of yellow arsenic 2 oz., sodium cyanide 8 oz., ammonium hydroxide 4 oz. in 1 gal. of water.

A slate-black on brass may be produced as follows: Immerse for a few seconds in a solution containing copper nitrate ($Cu(NO_3)_2$) 16 oz., potassium sulfide (K_2S) 1 oz., hydrochloric acid (HCl) 4 oz., water 1 gal., after which the parts are allowed to dry and then are immersed in a second solution made of 1 oz. potassium sulfide and 4 oz. hydrochloric acid to 1 gal. of water. Final drying is recommended at 110 deg. F. with final lacquering for protection.

If care is taken to keep an excess of copper carbonate in the following solution, brass parts may be quickly given an attractive black finish: copper carbonate 1 lb., ammonium hydroxide (26 deg.) 1 qt., water 2 qts. This bath is used at 175 deg. F.

Brown Finishes

A nut-brown color on copper is secured by dipping the clean parts in a solution of ammonium sulfide ($(NH_4)_2S$). This is followed by a thorough rinsing in cold and hot water and drying at 75 deg. F. A terra-cotta brown on copper is produced by using a solution of 4 oz. copper acetate and 3 oz. copper sulphate per gal. of water. Immersion is from 3 to 5 sec. at 108 deg. F.

Barium sulphide produces an umber brown on brass. The solution is barium sulphide 2 oz. to 1 gal. of water with immersion for

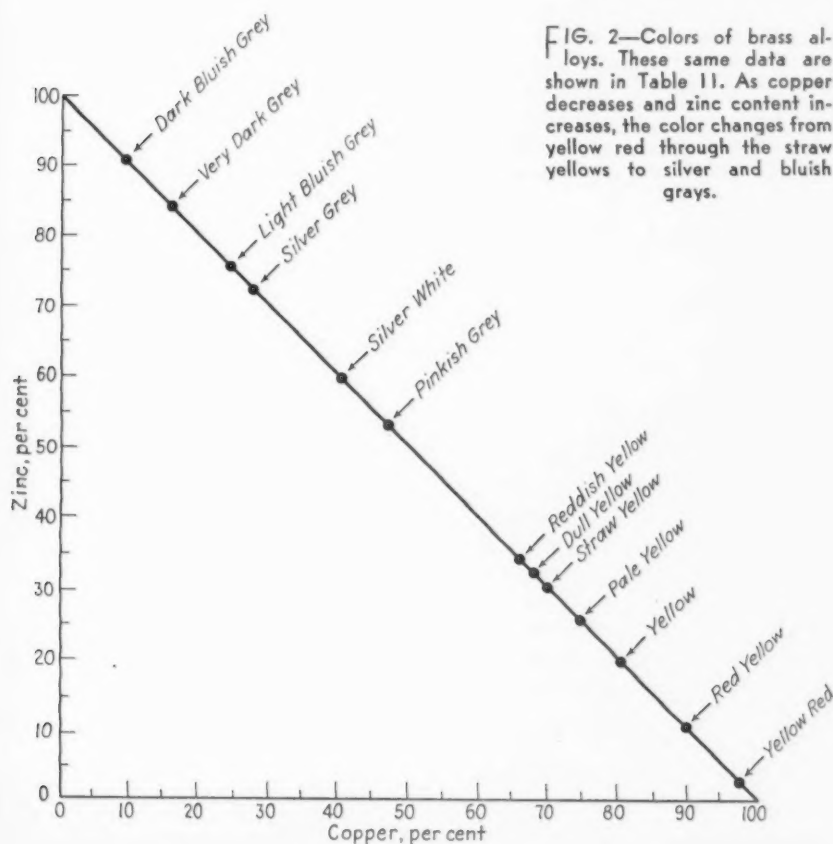


FIG. 2—Colors of brass alloys. These same data are shown in Table II. As copper decreases and zinc content increases, the color changes from yellow red through the straw yellows to silver and bluish grays.

about 5 sec. at 128 deg. F. The shades may be varied by reducing the amount of barium sulphide.

Many shades of brown, which are sometimes described as oak browns, may be produced on brass by the use of two solutions. The first is made up of 2 oz. antimony sulphide, 4 oz. of sodium hydroxide and $\frac{1}{4}$ oz. ammonium hydroxide to 1 gal. of water. Immersion in this is at 160 deg. F. and the color thus produced is darkened by passing through either of the following toning solutions: Copper sulphate 2 oz. per gal., or hydrochloric acid 1 oz. per gal.

A rich brown oxidized finish may be obtained on brass or brass plated articles as follows: Dip in 5 per cent sulfuric acid, rinse in cold water. Scratch brush wet with brass wire wheel (0.003 in. wire) with pumice. Dip in 3 per cent liver of sulfur solution. Scratch brush wet with brass wire wheel. A more uniform color can be obtained by buffing and coloring prior to oxidizing, although a satisfactory coating may be obtained without these steps.

When clean brass plate is immersed in a boiling solution containing 8 oz. of copper sulphate, 2 oz. of nickel sulphate and 8 oz. of hyposulphite of soda to 1 gal. of water, a uniform warm brown coat will appear.

An attractive brownish tone to bronze is sometimes secured by immersion in a solution of 1 oz. of yellow barium sulphide to 1 gal. of water held at 140 deg. F. and afterwards drying with a scratch brush. A similar effect on bronze is produced with 4 oz. copper sulphate, 1 oz. potassium chlorate to 1 gal. water at 180 deg. F.

Table I
Colors of Bronze Alloys

Composition in Per Cent		Color
Copper	Tin	
98.10	1.90	Red
96.27	3.73	Reddish yellow
95.00	5.00	Golden yellow
90.00	10.00	Greyish yellow
81.10	18.90	Yellowish red
80.00	20.00	Reddish grey
76.29	23.71	Bluish red
72.91	27.09	Reddish white
62.25	37.75	White
65.00	35.00	Bluish grey
61.71	38.29	Dark grey
25.00	75.00	Bluish white
11.84	88.16	Greyish white

Table II
Colors of Brass Alloys

Composition in Per Cent		Color
Copper	Zinc	
97.50	2.50	Yellow red
90.72	9.28	Red yellow
80.00	20.00	Yellow
74.58	25.42	Pale yellow
70.00	30.00	Yellow
66.18	33.82	Dull yellow
65.00	35.00	Red yellow
47.50	52.50	Pinkish grey
40.00	60.00	Silver white
27.10	72.90	Silver grey
25.00	75.00	Bluish grey
16.36	83.64	Very dark grey
10.00	90.00	Bluish grey

Table III
Typical Alloys of Zinc and Copper

Name	Composition in Per Cent	
	Copper	Zinc
Bronze powder	82-99	18-1
Tombac	80-98	20-2
Cartridge brass	70	30
Ordinary brass	66	34
Yellow brass	61-65	39-35
Cast brass	62	38
White brass	44	56
Brazing solder	50	50

Blue shades on copper are relatively difficult to produce. A bluish tone to brass is secured by immersing parts in a solution containing from 2 to 4 oz. of lead acetate and 8 oz. of hyposulphite of soda to 1 gal. of water with the solution held at 180 deg. F.

Blue and Green

A green verde finish on copper or brass is secured with a solution of 4 oz. of nitrate of copper, 4 oz. salammoniac and 4 oz. of calcium chloride to 1 gal. of water. This same solution is frequently used for stippling to produce antique effects, in which case it is usual to make a paste by mixing carbonate of copper with the liquid and to apply or stipple with a stiff bristle brush. Sometimes a piece of iron is introduced in the process to make rust spots.

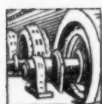
A good blue on copper is produced by a solution made up of $1\frac{1}{4}$ oz. of cupric acetate ($\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot \text{H}_2\text{O}$) and $\frac{4}{10}$ oz. of gelatin to 1 gal. of water. Through this solution a current of from 1.4 to 4.2 amp. per sq. ft. is passed, using copper both as anode and cathode. After depositing from the above solution, the material should be washed and immersed for 5 min. in a 5 per cent cupric acetate solution. Hues of startling intensity appear on the products one after another in succession until an excellent blue finally develops.

A fairly common means of securing blue on brass is to immerse the work in a solution containing 16 oz. of white arsenic to 1 gal. of muriatic acid and $\frac{1}{2}$ gal. of water. This solution is used cold, producing light blue colors.

The Metallization of Machine Elements

By W. E. GLIDDEN

*Metallizing Engineering
Co., Chicago, Ill.*



METALLIZING, the method of spraying molten metal so that it will adhere to a solid base, brings to the fore practical questions regarding strength of bond, effects of heat treatment, effectiveness against corrosion and practical limits of coating cylinders of small diameters. A number of tests, described herein, have served to throw light on some of these problems.

Information concerning machinability has been obtained by taking two steel rods 10 in. long and 2 in. in diameter, which were machined at the center to 1½ in. in diameter and 4 in. long, as shown in Fig. 1.

These rods were sprayed immediately after the machining operation to a thickness of approximately 0.010 in. One rod was sprayed with high-carbon wire and the other with low-carbon wire. They then were placed in a lathe about ¼ in. off center and were turned until the base metal could be seen. On the high-carbon steel specimen the sprayed metal tended to tear away from the surface, this tendency increasing with a heavier cut. It was noted that high-carbon

steel, as sprayed, was very hard and difficult to machine. The low-carbon sprayed steel seemed to give slightly better bond than the high-carbon steel, although with regard to other characteristics it behaved quite similarly. However, the low-carbon wire, as sprayed, can be machined without difficulty.

LAST week the author recommended certain procedures for spraying metal onto machine elements which must subsequently stand up under grinding and machining operations. In this article, the subject of sprayed metals is carried further. Experiments to determine the tensile strength of sprayed steel are reviewed, but of even greater interest is the volume of data on the corrosion resistance of various sprayed metals. Many interesting points may be observed, one of which is the poor corrosion resistance of copper and stainless steel.

In attempts to determine the strength of the bond between sprayed metal and the surface to which it is sprayed, specimens were cut in two in the center. The ends of one specimen were ground smooth, another sand-blasted, and grooves were cut in the third. It was impossible to metallize to a depth sufficient to permit the joining of the two halves by any method, and it was discovered that sprayed metal would not adhere even slightly to a ground surface. Adhesion to a sand blasted surface was slightly better. The grooved surface gave the best bond, and a surface of sufficient depth was finally obtained. An effort was made to join the two halves together by soldering, but the transmitted heat loosened the metallized portion.

Standard Specimen Used

In a further attempt to find the tensile strength of the sprayed metal, standard tensile specimens were turned. These specimens were similar to that shown in Fig. 1. The first six were made of WD 1095 steel. These samples were turned down to 0.505 in. diameter

in the center. Two of the specimens were left at this diameter. An attempt was made to machine the metallized portion of these specimens, Nos. 3 and 4, but the surfaces were too hard and so the pieces were annealed.

On the remaining four specimens a rough thread was cut, 24 to the

sprayed metal. Thus these tensile strength tests were unsatisfactory.

Satisfactory Tensile Specimen

As a last resort, specimens were machined as above, and in addition the center of the specimen was

dropped from 331 Brinell to about 241 Brinell. It was noted also that the adhesion of the sprayed metal to the base increased appreciably by heat treatment. Particles of the sprayed coating adhered to the core when it pulled away from the coating. On the untreated specimens, the core pulled away cleanly during elongation.

Specimens 16 and 17 were not heat treated, but were ground finished to 0.575 in. diameter and then pulled. The values obtained from these two specimens (14,100 and 14,000 lb. per sq. in.) check with

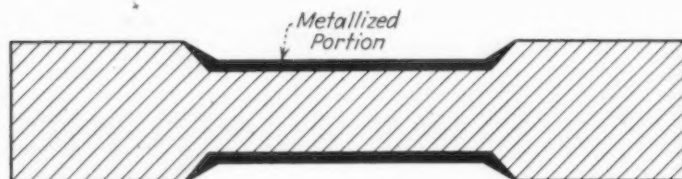


FIG. 1—Tests for machineability of metallized coatings were made on steel rods, such as the one shown here, measuring 10 in. long and turned to 1/2 in. at the center. The rods were sprayed with steel to a depth of 0.010 in.

inch. This surface was then built up with a high carbon coating. An attempt was made to machine the metallized portion of these specimens, Nos. 3 and 4, but the surfaces were too hard and so the pieces were annealed.

Specimens Nos. 2 and 5 were heated to 1475 deg. F., quenched in oil and drawn at 800 deg. F. This treatment, to which the WD 1095 steel responded, had no desirable effect upon the sprayed metal. For this reason, it was considered advisable to check the carbon content of the metallic coating. It was found that in the wire form the steel contained 0.70 carbon. In the sprayed condition, the steel was found to contain 0.52 carbon, a loss of 0.18 points, or 25.7 per cent. Due to this carbon loss, the sprayed metal could not be expected to respond to a heat treatment which would affect a WD 1095 steel. It was noted, however, that the heat treatment did improve the machining properties.

In order to approximate the carbon content of the sprayed metal, specimens of WD 1045 steel were used next. Specimens 12 and 13 were turned to 0.505 in. Specimen 12 was left as received, and No. 13 was heat treated. The remaining specimens, Nos. 7, 9 and 10, were threaded and coated with high carbon steel. Specimen 7 was finish-ground to 0.650 in. and was not heat treated. Nos. 9 and 10 were heat treated and turned to 0.600 in. and then pulled.

As with the WD 1095 specimens, no results could be obtained which checked, and, in addition, it could not be proved that heat treatment had any desirable effect upon the

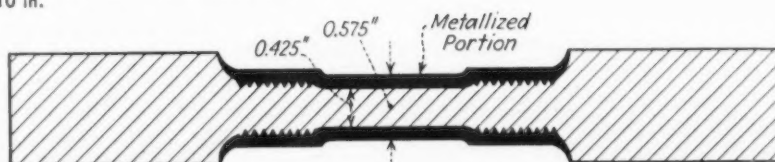


FIG. 2—A specimen constructed in this manner gave a fairly accurate value for the tensile strength of sprayed steel coatings.

FIG. 3—Salt spray test of a sprayed cadmium coating. Discoloration, but no rust, characterized this metal.



turned to 0.425 in. diameter for a length of 1 in. This is illustrated in Fig. 2. Specimens (14, 15, 16 and 17) were then sand blasted and coated with high-carbon steel. Specimens 14 and 15 were heat treated, turned to 0.575 in. diameter, and were then pulled. The tensile strength of the metallized portion of the two samples was computed to be 25,200 lb. per sq. in. and 7100 lb. per sq. in., respectively.

In this test, there was eliminated the factor of uncertainty due to sharp corners. The wide difference in values must be due to some other reason, probably occurring in some phase of heat treatment. It was found that during heat treatment, the hardness of the sprayed metal

each other, and also check the figures obtained in other tests.

Heat treatment of high-carbon coatings causes a drop in hardness, an increase in bond, and makes the high carbon coating easy to machine. It seems evident, therefore, that when surface hardness is desired, the sprayed coating should not be heat treated and should be finish ground. If it is necessary to increase the adhesive properties of the sprayed metal, heat treatment should be given, but it must be borne in mind that the carbon content drops during the spraying operation.

In order to determine the smallest diameter tube, the inside of which could be metallized, five cyl-

inders of 8 in. to 12 in. were made of 1/16 in. sheet steel. The metal was prepared by sand blasting. The nozzle of the metallizing gun must be kept at least 6 in. away from the surface being sprayed or the heat of the flame will burn the sprayed metal and cause it to blister. Also, the rear of the gun must be at least 3 in. away from the surface of the tube or the wire feeding into the gun will kink. By adding to these two dimensions, the distance from the nozzle to the butt of the gun, which is about 7 in., it can be seen that the minimum diameter of a tube 3 ft. long which can be sprayed throughout its length from one end will be at least 15 in. This restriction, however, is applicable only to the standard gun. Rotating nozzles for coating interior surfaces have extensions of 30 in. to 12 ft. to pass inside 1 in. to 4 in. inside diameters, and

sand blasted. Also, four 2-ft. rods 1 in. in diameter of round stock were prepared by sand blasting. These plates and rods were coated with approximately 0.006 in. of various metals and placed in salt spray and allowed to remain there for 360 hr.

Sample No. 5 was a plate prepared by sand blasting and then coated with tin. At the end of 12 hr. no rust had appeared but when examined at the 120 hr. point a slight rust was evident. At the end of 240 hr. rust had progressed slightly; and when removed at the end of 360 hr. the sample was rusted around the edge and in several small spots.

Sample No. 6, shown in Fig. 3, was prepared by sand blasting and was then metallized with cadmium. After 6 hr. in the salt spray no rust was evident but the sample was slightly discolored. No change was

of zinc. Its reaction to the salt spray was quite similar to the cadmium sample except that after 6 hr. in the salt spray a coating of zinc oxide had begun to form upon the surface. This coating continued to increase in thickness throughout the duration of exposure, and at the end of the 360-hr. period no rust was evident but the sample was covered with a thick white coating of zinc oxide.

Sample No. 8 was sprayed with a coating of stainless steel of the 18 and 8 type. At the end of the 6-hr. period in the salt spray this sample was heavily rusted. This rust progressed rapidly, and at the end of the 12-hr. period, this sample, and others sprayed with stainless steel, were removed from the salt spray, again sand blasted and again sprayed with a heavier coating of stainless steel. No improvement was noted, but it was thought that if the surface metallized with stainless steel had been given a ground finish then the results obtained might have been much more satisfactory.

Corrosion of Bar Stock

Sample No. 9 was grooved and sand blasted and metallized with tin. Its performance was identical with that of sample No. 5 which was a sand blasted surface also metallized with tin. Sample No. 10 was grooved and sand blasted, and coated with cadmium. It was affected by the salt spray in the same manner as was sample No. 6.

Sample No. 11 was a ground surface, sand blasted, which was also coated with tin, and performance in

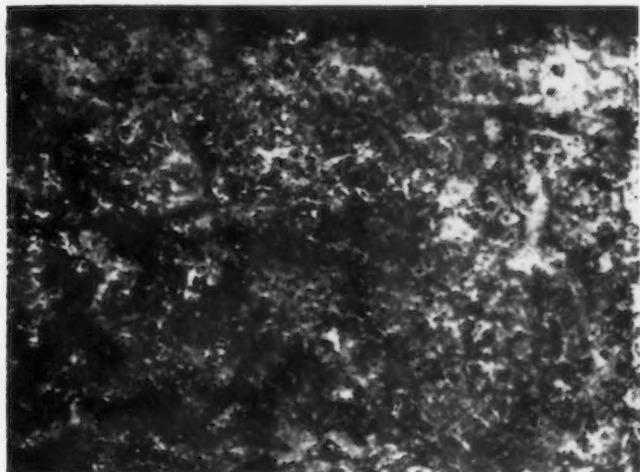


FIG. 5—Salt spray test for copper sprayed onto a sand blasted steel plate. The presence of copper seemed to accelerate corrosion rather than inhibit it.

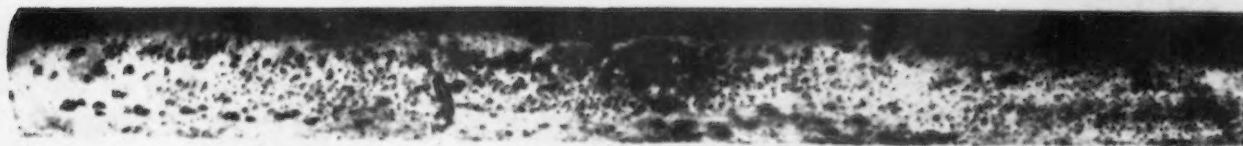


FIG. 4—Salt spray test for a sprayed tin coating on 1-in. diameter bar stock. Pin point rust spots appeared after 6 hr.

extensions up to 30 ft. for coating inside diameters above 4 in.

Corrosion Tests

For the purpose of making corrosion tests, light plates of 1020 steel measuring 4 in. by 6 in. were prepared. Four of these were sand blasted, two were grooved and sand blasted, and two were ground and

noted at the end of a 12-hr. period. After 120 hr., no rust was as yet evident, but the discoloration had become more noticeable. No further change was noted on this sample throughout the remainder of its exposure to the salt spray, except that the discoloration progressed slightly.

Sample No. 7 received a coating

the salt spray was comparable with that of samples No. 5 and No. 9. This indicates that, with the softer metals, preparation of the surface is not of paramount importance so long as the surface is clean and comparatively rough; that is, sand blasting will give a surface which is quite satisfactory.

(CONCLUDED ON PAGE 53)



Progress in Detroit's Appren t



IN the five months that have elapsed since the first formal presentation of the program to Detroit's industries, a great deal has been accomplished in furthering apprenticeship. A number of programs have been started and hundreds of boys have been put to work. It was well over a year ago that a group of personnel workers first got together and started a movement for apprentice training. Even then it was apparent that industry was about to be faced with a shortage of skilled men, as a result of the abandonment of training programs in the depression years. A committee

was appointed to assemble facts and to formulate a definite procedure to train apprentices in co-operation with the public education authorities of Detroit. This group, known as the Detroit Manufacturers' Committee for Apprenticeship Training, first brought its work to the attention of industry at a dinner on Oct. 29, 1935, which was attended by approximately 75 top executives of the largest manufacturers in the metropolitan area. Particular emphasis was placed by speakers on morale building qualities of apprenticeship in the stabilization of labor relations.

This group endorsed the work of the Committee and resolved that the various manufacturers, small as well as large, be urged to establish apprentice systems in their plants and employ as many apprentices as the extent of their operations might warrant. There was a lot of enthusiasm shown at this meeting, but it was a question as to whether or not the plan could actually be put into effect.

The Detroit Employers Association

Chief aid to the group has been the Employers' Association of Detroit, backed by the National Metal

Trades Association, the Michigan Manufacturers' Association and the Detroit Board of Education. Largely through the financial assistance of the Employers' Association, the committee was enabled to obtain the full-time services of a man who had long been connected with Detroit's public school system in vocational work. O. F. Carpenter, apprentice director, has been loaned by the Board of Education to the committee for a year on leave from his regular job as assistant principal of the Wilbur Wright Vocational High School. A large portion of the placement of the apprentices is being handled through his office at the Employers' Association and in cooperation with the Placement Bureau of the Board of Education. Obviously, of course, a number of plants are hiring their own boys through private channels. Without attempting to distinguish those apprentices who already are at work or who are working as a result of the co-operative program of the Wright High School, there are now approximately 720 apprentices at work, outside of those employed by

shop and for the time he spends in school, also for a vacation. Upon entering, each boy is paid a "scholarship" of \$6 per week and this rate is gradually increased according to the student's ability to a maximum of \$24 a week. In addition, a noonday hot lunch is given each boy.

Aside from the trade school, which is separately incorporated, there is also an apprentice school which is open to employees of the Ford Motor Co. Boys and older men in this school work in the regular shops of the Ford Motor Co. and, in addition, receive classroom instruction on their own time. The apprentices are shifted about from machine to machine as fast as they master the operations. They are paid regular Ford rates.

In June, 1935, the Ford Motor Co. opened a new training school primarily intended to take care of a limited number of recent high school graduates unable to find employment. A special department has been set up in the foundry machine shop building and modern equipment has been installed for tool room and electrical work, as well as gasoline motor re-

pair. The training continues for three months, during which time the student receives \$22 a week. At the end of this time he is offered work in the regular shops at Ford Motor Co. at the minimum base rate of \$6 a day, if he has shown fitness for such work. As 200 is capacity for the department, 800 such youths, ranging between 18 and 20 years of age, can be so placed each year.

A modification of this type of vestibule school is also being started by the Briggs Mfg. Co. The company is segregating some surplus die shop machinery in a section of its Highland Park plant and will give a 90-day training period to about 40 boys at a time.

The idea will not be to train die makers in this short period, but merely to introduce boys to production machinery and to train them in safety habits and deportment in the shop. At the end of the period they will be given work in the regular shops of the company, but not necessarily in the die shop. No attempt will be made at the present time to train these students along the lines of body

Apprenticeship Program

By FRANK J. OLIVER

Detroit Editor, The Iron Age

the Ford Motor Co. Of this number, about 140 are cooperative students, working and going to high school on an alternating period of two weeks.

Henry Ford Trade School

While a great deal has been done to stir up interest in apprenticeship, it should not be forgotten that the Henry Ford Trade School has been carrying on since 1916. This school has about 1700 boys attending at the present time, ranging in age from 12 to 18 years. Classroom instruction is provided by the school itself and the boy is paid both for the time he spends in the



building operations, such as various forms of electric and gas welding.

Chrysler Trade School

Chrysler also is accumulating about 90 machines from various plants for an apprentice school and will provide special supervision for over a hundred boys ultimately. Approximately 56,000 sq. ft. of floor space on an upper floor of a warehouse building at the Dodge main plant is to be devoted to the school. What Chrysler plans to do is to have four to six typical manufacturing lines on which the apprentices can work on certain standard production parts such as water pumps, brake levers and clutch pedals, hydraulic brake cylinders and other components that do not change in design radically from year to year. By taking such parts as these, it will be possible to make the school self-supporting by absorbing a percentage of the year's output and extending it over a period of twelve months, so that employment is steady. The machines have been tooled up on a production basis. There will be a tool crib in conjunction with the production lines and a small tool room where experience in jig and fixture work can be obtained.

Class room instruction for two hours a week will be provided by the company. For those students who have not had drafting in high school, the apprentice will be expected to get this work at a night high school on his own time. Incidentally, as in the case of most of the plants, only high school grad-

uates are being considered as candidates and in this instance they must be sons or nephews of Chrysler employees. About 20 boys have been hired to date. Chrysler's program is set up largely with the idea of training skilled operators rather than all-around machinists or tool or die makers. A year and a half in the school and six months in the corporation shops is the length of the program.

Training on Die Work

Fisher Body Corp., which has 68 apprentices, including 16 cooperative high school students, has the boys scattered through the regular die shops and in the die design drafting room, where they are being trained specifically either as die makers or as die designers. Great Lakes Steel Co. has practically all of its 47 apprentices in the accounting department, where the general objective will be to train cost clerks and cost accountants. The Detroit Edison Co. also has many of its apprentices engaged in office work.

Burroughs Adding Machine Co. has had an apprentice school in operation for many years, employing about 36 boys and providing all the class room instruction within the plant. Chevrolet has two apprentice schools, one in Flint, the other in Detroit, and both segregated from the rest of the plant. Many of the companies entering apprenticeship work for the first time, however, are scattering the boys throughout the regular shops.

Murray Corp., for example, will place the apprentices on production body building until the die work for '37 models gets started, then put the boys in the tool and die shops. There are also some electrical apprentices. The backbone of the training will be in the die end, but Murray hopes to get some good all-around body mechanics out of the program, as well as die makers. Briggs' ultimate training plans contemplate such a set-up also.

With the exception of those companies mentioned, most of the concerns are permitting the boys to attend school four hours a week on company time, on what is known as the Extension Plan. Extension courses in day time are available to any Detroit boy, but all night school work has a fee attached. Typical related courses that such apprentices might take over a three-year period are illustrated in the accompanying chart.

The Standard Plan

The standard cooperative plan provides two years of alternating work in school and in the shop and two or more years of full-time employment, with four to eight hours of extension school per week. One full year of trade training in the vocational high school precedes this program. If an apprentice is a graduate of a technical or academic high school, he is expected to put in 3 to 3½ years of apprentice work with extension courses. Not all companies are following this plan, but it is the goal at which the committee is aiming.

At first, attempts were made to sell the idea of a regular form of indenture or contract. The larger corporations, however, have fought shy of such a plan and out of the whole 720 apprentices now at work, only about a dozen are on a contract basis. When a boy enters such a course he is usually told in a general way what the company has in mind, but no statement is given in writing promising him so many hours of this kind or that kind of work. Detroit's manufacturers are rugged individualists, and the best that the committee has been able to do is provide information and inspiration, but has not been able to dictate policy.

When the plan was first announced, most companies attempted to recruit boys who had graduated



from the three technical high schools of the city, as well as the Wright Vocational High School. Because of the shortage of available candidates who were not already working, however, the plan has been extended to include any graduate of any high school in the city. In fact, some companies have expressed a preference for boys who had not already received shop training in school. Even with the large amount of recent high school graduates not yet employed, it has been difficult to find the right type of student to recruit for these apprentice courses. All the companies are looking for promising boys who might ultimately develop into executive caliber, and they are not interested in mediocre personalities. The problem has been to induce the high-grade boys who are mechanically inclined to go in for this kind of a career.

Statistics show that according to the 1930 census, almost 50 per cent of those gainfully employed in Detroit were in the manufacturing and mechanical industries and only 6 per cent in the professions. This means that the majority of Detroit's young men will of necessity find employment in industry, but many of them will enter untrained and only because they have failed to get a foothold in the field of their original choice, a field perhaps that appeared to be somewhat higher in the social scale. Eighty per cent of the students in high school are taking commercial or college preparatory courses, yet statistically it is inevitable that 50 per cent of them will land ultimately in industry. It is felt that if more vocational high schools were available, more students could be induced to enter the trades. But like many other cities, Detroit is handicapped by lack of funds for capital expenditures. The Wright High School now has 1200 students in attendance, although it was designed to handle only 700. This large overload has been possible only because of the cooperative plan which permits one group to be at work while the other group is in school.

Speaking of cooperative work, there are several schools on a college level in Detroit that operate on a cooperative basis, principally the University of Detroit, and there is also the General Motors Institute of Technology at Flint. In many cases, students taking college

Related Subjects Program Extension or Plant School Special 3-Year Course for Tech Graduates

	Instruction Hrs. per Wk.
1st Term	
Shop Math	1
Drafting	2
English	1
2nd Term	
Shop Math	1
Drafting	2
Shop Theory	1
3rd Term	
Shop Math	1
Drafting	2
Shop Theory	1
4th Term	
Shop Math	1
Drafting	2
Shop Theory	1
5th Term	
Shop Math	1
Ind. Chem.	2
Ind. Econ.	1
6th Term	
Shop Math	1
Ind. Chem.	1
Shop Theory	1
Ind. Rel.	1

(3 1/2 Yrs. for Academic Graduates)

7th Term	
Shop Math.	1
Ind. Science	1
Drafting	2
Maximum instruction	@ 48
weeks 784 hours.	
Minimum instruction	@ 20
weeks 560 hours.	

RECOMMENDATION:

Four 12 week Terms or
Two 20 week plus 1-8 week Term
in Summer Session.

courses are being trained for supervisory positions in the shop, as well as for strictly engineering department work. It is obvious that the men on a college level will probably attain those objectives faster and in larger percentages than will the boys in the apprentice systems who are obviously being trained first to fill positions in the skilled trades. As is well known, however, a fair percentage of these boys will eventually attain positions of authority and prominence in industry.

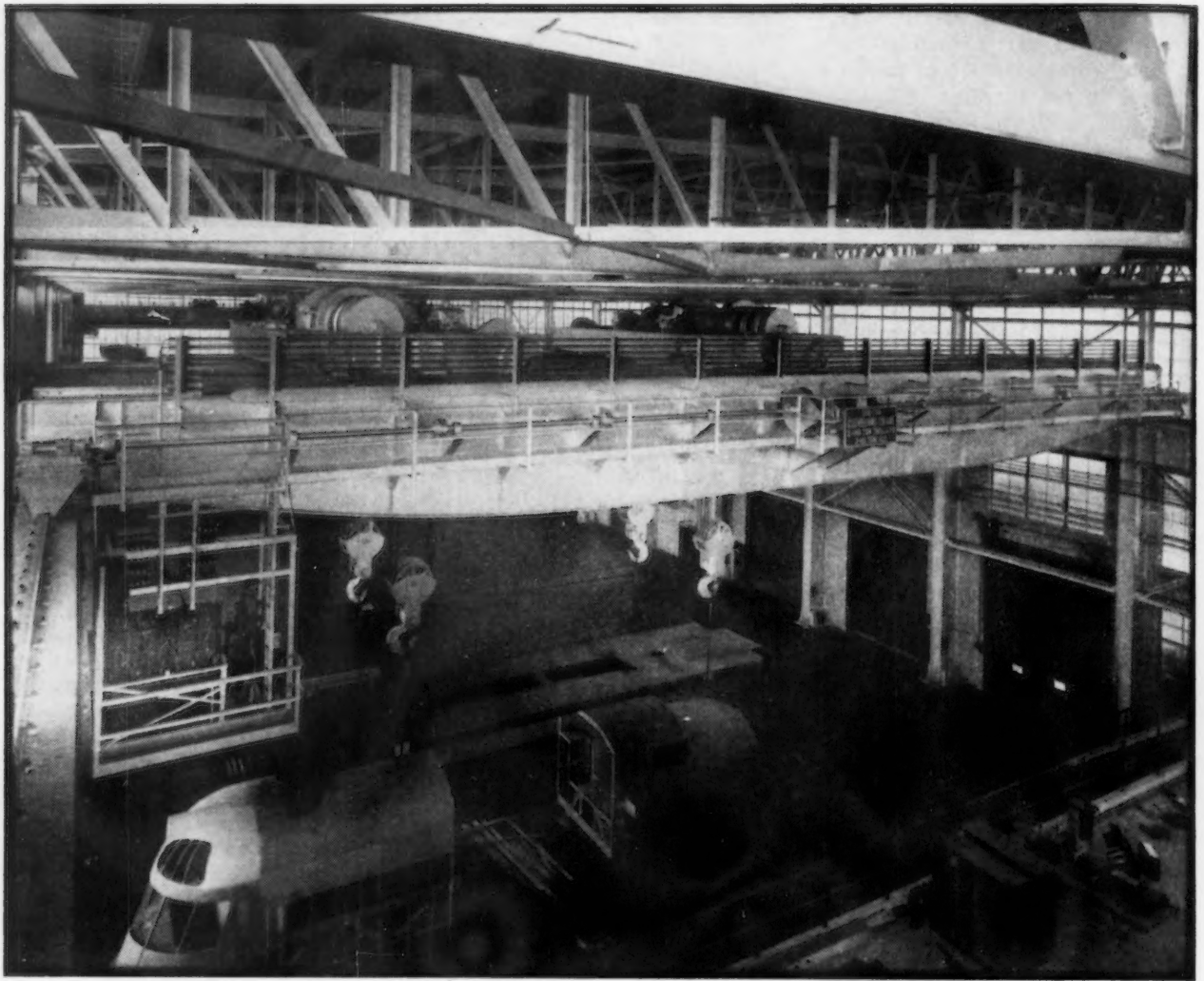
Detroit Likes It

There is a great deal of enthusiasm in Detroit today regarding apprenticeship. Some executives are

almost over-enthusiastic, to the extent that they would like to enlarge the number of apprentices in training beyond the number that could normally be absorbed into the company in worth-while jobs. To avoid this difficulty, several companies have been staggering the number of apprentices taken on in any period so that those completing the course will "come off the line" at appreciable intervals. Kelsey-Hayes Wheel Co., for example, plans to take on four boys every three months until they build up a total of 48. Chrysler intends to build up to 105 students as a present objective, but has only selected 20 thus far. Such a plan calls for a very flexible curriculum in the example of extension classes.

Other well-known companies not mentioned specifically above, but which are engaged in apprenticeship work, include the following: Hudson Motor Car Co., 16 (8 pair of cooperative high school students); Budd Wheel Co., 8; Packard Motor Car Co., 19; General Motors Corp., 6; U. S. Rubber Co. Products, Inc., 8; Long Manufacturing Co., 8; Ternsted Mfg. Division of General Motors, 48; Midland Steel Products Corp., 12; Detroit Board of Education, 38. Apprentices working for the Board of Education are employed on a cooperative basis in the power plants of 19 different public schools in the city.

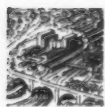
Mention has been made of pay. Except for the Ford Trade School, which is primarily a school and not a shop apprenticeship program, pay for apprentices in Detroit begins at 40c. an hour minimum and in many cases starts at 45c. The plan is to raise the rate of pay about 5c. an hour every six months. These figures are out of line with what has been done in other cities in other years, but is in keeping with the general pay rates in Detroit industrial plants. Such a schedule of pay is intended to attract the capable boy who, if he has the proper physique, might be able to hire in on an assembly line at 75 or 80c. an hour without, of course, having any future ahead of him except small increases in pay as he developed his speed. It is expected that on this basis Detroit will be able to build up its industrial training so as to have a minimum of 1200 apprentices working throughout the year.



THIS 200-ton electric traveling crane is of all-welded construction.

o o o

Illinois Cornfield Becomes D

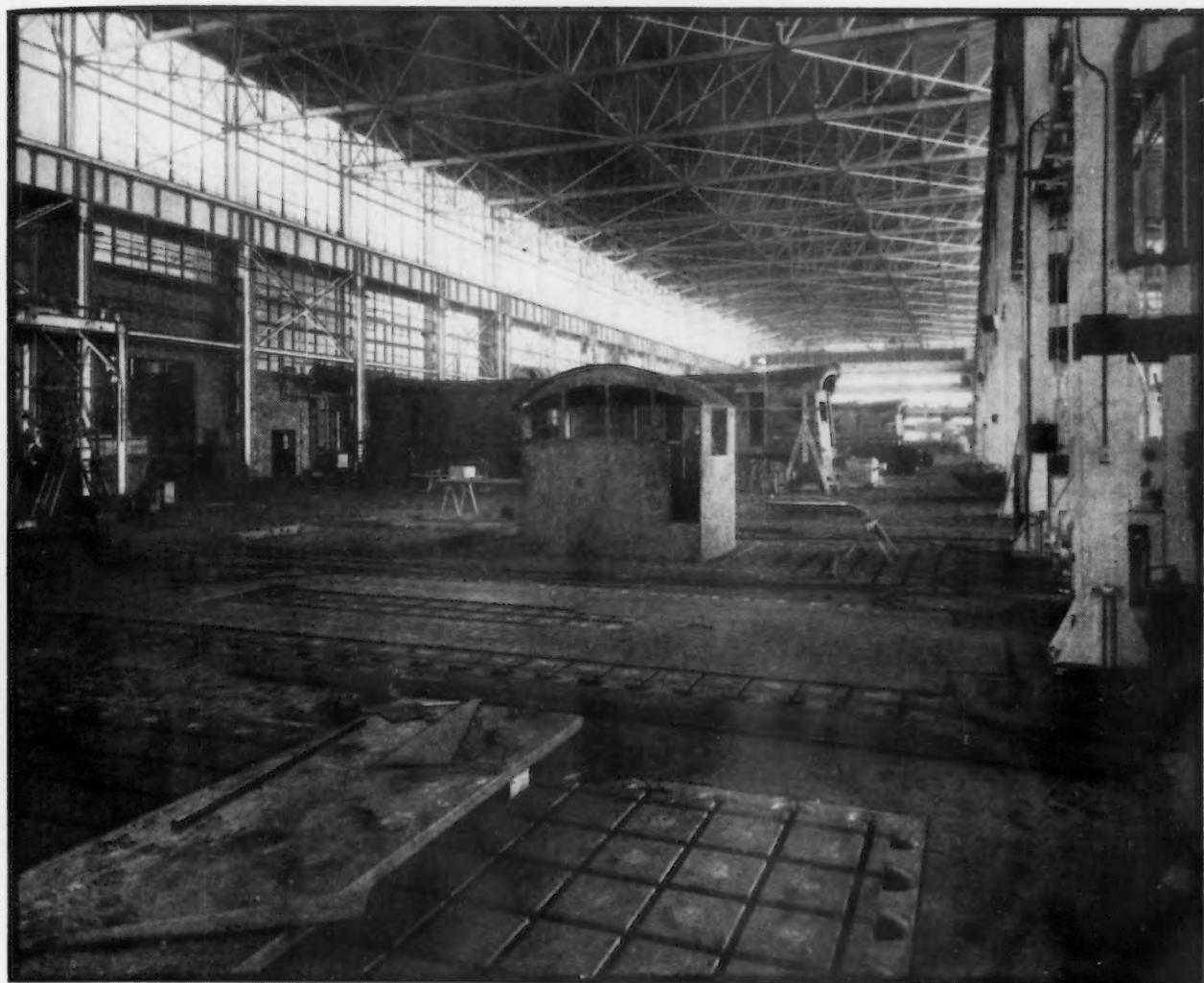


COMPLETION of the Diesel locomotive works for the Electro-Motive Corp. division of the General Motors Corp., at La-Grange, Ill., in a period of nine months after acquisition of the 74-acre cornfield sets a new pace for heavy industrial construction.

Electrically welded structural steel throughout nine buildings included in the project affords an unusual application of welding for heavy structural work. Fifty

thousand feet of welding rods and $7\frac{1}{2}$ tons of electrodes were required for erection of more than 2000 tons of structural members. Much of the welding was done at The Austin Co.'s structural shop in Cleveland, from which 104-ft. roof trusses and 65-ft. columns, weighing 7 and 8 tons respectively, were shipped in prefabricated state to facilitate erection on the site. Only 17 per cent of the welding rods and electrodes used on the job were shipped to the site.

The largest building—550 ft. by 170 ft.—houses the erection shop and machine shops. It is surrounded by 57,000 sq. ft. of horizontal sash. The main erection aisle has a clear span of 104 ft. with 49-ft. clearance under the roof trusses. It extends for more than 500 ft. and consists of 24 locomotive construction bays, most of which are served by track laid transversely in the aisle. The individual bays have been designed for specific steps in locomotive con-



SPECIAL cast iron bed plates serve as foundations for precision welding operations.

Diesel Locomotive Works

struction and are closely related in function to adjacent facilities for heat treating, shot blasting, painting, etc., which are housed in individual structures that open directly onto the main erection aisle on the east.

Alongside the erection shop and opening into it on the west is the machine shop. This has a clear span of 64 ft. and extends the full length of the main aisle. While transverse monitors provide for permanent lighting and ventilation

in this part of the plant, a section of horizontal sash closes in its 550-ft. west wall, which will be removed when contemplated expansion is carried forward. The machining of all the major locomotive parts occurs in this aisle, while smaller precision parts, instrument panels, etc., are finished on a balcony at the south end of the main aisle situated above the shop superintendent's and shop office quarters. Dies, machine parts and other shop equipment supplies are

concentrated in a department which is located at the head of the machine shop aisle.

Crane Service

In the main erecting aisle a 200-ton all-welded electric traveling crane has been installed on track supported on the structural columns which separate the main aisle from the machine shop on the west and from the heat treating, shot blasting, paint shop and other structures on the east. This crane,

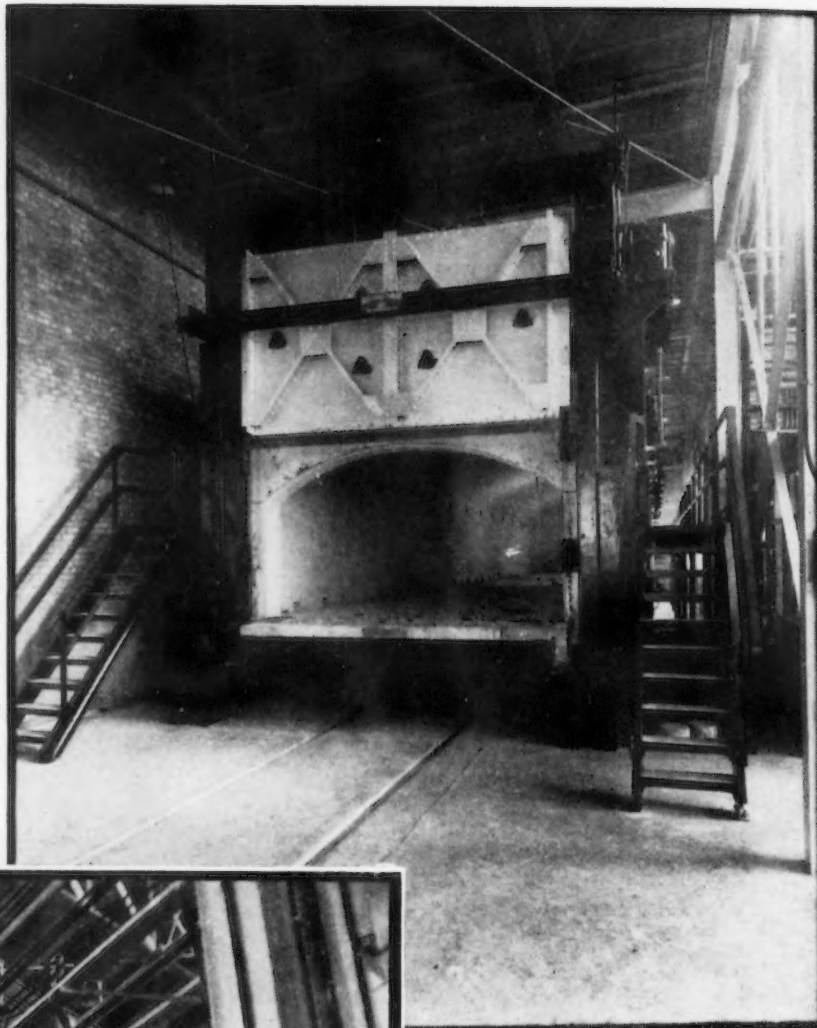
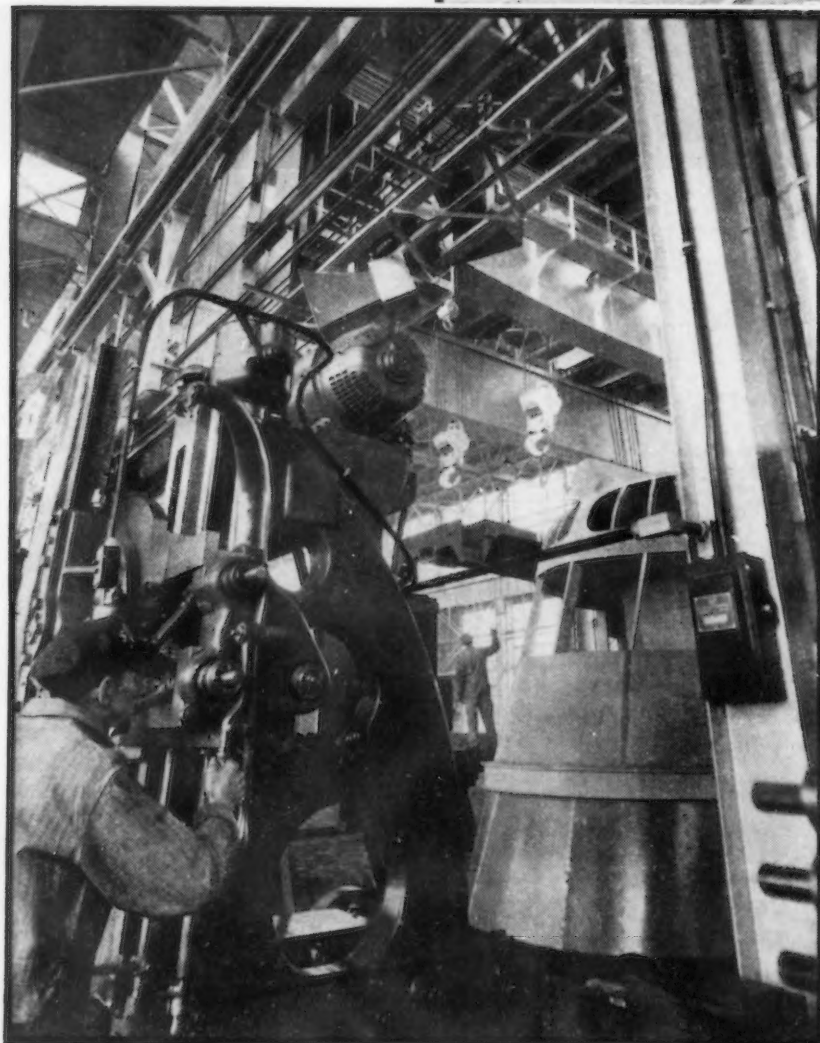
equipped with four 50-ton hooks, has a one-piece all-welded trolley frame and one-piece all-welded end trucks, with all-welded box girders and bearings of the MCB type. All gears and pinions are inclosed in welded oil-tight cases. All conductors are of angle iron and Hyatt roller bearings have been used throughout.

The two auxiliary electric traveling cranes of 30 and 40 tons capacity which supplement handling facilities in the main aisle and the balcony precision machine shop, as well as the 200-ton crane, are equipped with hydraulic bridge brakes and Clark face-plate type controllers, with anti-friction motors set up for 550 volts DC. Power is provided by Winton Diesel engines on test at the plant. This aisle is also served by a 15-ton gantry crane which passes transversely through the plant at the

o o o

BELOW

GENERAL view looking into the main erection aisle.



ABOVE

THIS gas fired annealing furnace measures 22 ft. by 70 ft.

o o o

north end on rails in a double bay 48 ft. wide. This track extends 200 ft. along an unloading area outside the plant to facilitate bringing heavy materials into the shop. Two 20-ton traveling cranes answer handling problems in the machine shop.

Welding Facilities

The facilities for welding throughout the entire plant are adequate to meet every need in production which utilizes welding to the exclusion of almost all other methods. Among these facilities are special cast iron bed plates in several of the bays, machined and slotted to serve as foundations for precision welding operations.

Size of the structure and the necessity for the diversified current distribution to all parts of the plant for purposes of illumination,

(CONCLUDED ON PAGE 53)

Working to Music

You Probably Couldn't Do

This in a Steel Mill or

Boiler Factory, But It Might

Work Elsewhere



o o o



MUSIC during working hours for increased efficiency of shop employees sounds like a paradox, considered both literally and figuratively. Regular industrial practice ordinarily would indicate the advantage of omission rather than introduction of what would seem such a diverting influence while the worker is on the job.

Under actually tested operation, however, the results of broadcasting popular music to employees while engaged in their duties justify the opinion that such a procedure is likely to become a definite phase of shop development in the future, where the nature of the task and working conditions lend themselves to a practice of this kind. Anything that will enhance the efficiency and morale of plant operatives is worthy of consideration, and with an outstanding example of what melodious broadcasts during shop hours will accomplish, described in the following, music is entering the modern industrial picture.

With straight-line, speed production of today, where groups of individual workers are allotted spe-

cific jobs, to be constantly repeated throughout the working hours, it is natural that a suitable outside or foreign agency, to consider appropriate music in that sense, will have a beneficial effect on the spirit of the employees, tending to ease a monotonous routine. As intimated above, the matter of mind diversion to the detriment of the worker's task presents itself as a contradictory factor in the best interests of production and the employer—but actual experience shows this of minor consideration under an established and perfected plan of periodic shop broadcasts.

The Standard Motor Co., Ltd., Canley, Coventry, England, one of the large manufacturers of automobiles in that country, has pioneered in the broadcasting of music

in certain divisions of its plant with marked success. Loudspeaker equipment originally was installed in the trimming department, more or less as an experiment. Within a short period of time, but sufficiently long to allow careful calculations of the complete reaction, the results have been so satisfactory that an expansion of the plan is now in progress. Similar loudspeakers are being installed in other departments of the works, with the exception of those where machinery operations or local noise will prevent the music from being heard.

Taking the trimming department, noted, as a typical example of what is being accomplished at the Standard plant, the equipment installation consists of a ten-watt amplifier, coupled to an eight-record automatic change gramophone, as well as a radio set, furnished by the British Thomson-Houston Co. This division gives employment to a large quota of women and girls. A number of loudspeakers are located in different parts of the one-story shop, near the roof trusses, or well above the floor level. Some of these are of

the horn type, while others are of the cone variety and baffle board, dependent upon the grouping of the workers and immediate conditions.

At the present time, one-hour programs are broadcast during working periods in the morning and afternoon. Gramophone records are being used almost exclusively, owing to the difficulty of securing suitable music from radio sources continuously for the duration of the shop programs. The installation is operated by a storekeeper in a corner of the department, and requires but minor attention.

The stock of gramophone records originally supplied by the company for the daily broadcasts has been considerably supplemented by the employees, many of whom bring favorite records from home to be played on the shop programs. The company has found that dance tunes are the most popular, with march music next in line. Simple melodies and tunes with a definite rhythm, it is shown, harmonize best with the customary noise of the machines in this shop.

A convincing proof of the popu-

larity of the development is indicated by the universal demand for the broadcasts at the established hours morning and afternoon should the store-keeper happen to be a little tardy in beginning the programs.

Discussing the results of this development, the company says: "Naturally we were anxious to discover the effect of the musical broadcasts on the efficiency of the shop employees. After careful investigation, we have nothing but good to report. Efficiency and careful workmanship certainly have not deteriorated, while the music gives rise to a cheerful atmosphere which can only have a beneficial reaction on the spirit of the workers, who operate under highly organized conditions in our plant."

It is interesting to note that other British industries, profiting from the example and experience of the Standard company, are following the plan of broadcasting shop music for their workers. Among these, a new knitting mill now in course of erection at Manchester is being fully equipped for such procedure in its different departments.





Handling Cold Strip Coils

At Campbell Works



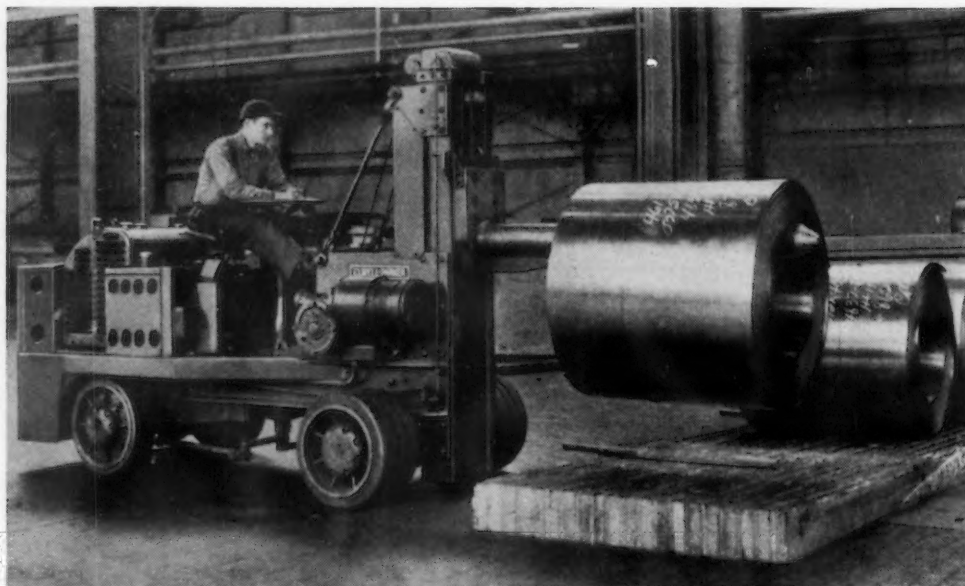
A recent application of industrial trucks for heavy duty service in the steel industry is for handling coils in the new cold strip mill of the Campbell Works of the Youngstown Sheet & Tube Co. Three ram type trucks are used, each performing a separate function in handling the steel between major processes. This necessitated the scheduling of operations of the trucks to keep steel moving in the

heavy volume required for maintaining the mill schedules and the coils are kept flowing in the steady volume. This method of handling the coils is proving both efficient and low in cost.

One truck carries the coils of hot rolled strip from the continuous pickling unit to the cold rolling stands or to stock storage back of the first stand of the cold roll mill. This stock pile is provided because of varying production speeds of the

mill. The second truck delivers the cold rolled strip from the last finishing stand to weighing scales and thence to a stock pile. The third truck delivers the coils from the storage pile to rotary shears.

The plant is arranged for the convenient picking up of the coils when they are to be moved by the trucks. The strip as it feeds out of the pickling unit is coiled on a mandrel and from this it slides off endways onto a set of rollers in



TRUCK lifting strip coils by means of 72-in. ram. The ram has a lifting range of 11 to 60 in., above floor.

trough formation and then down a slight incline until the coil is brought to a stop against a bumper block. This impact evens up the ends of the coils.

From the bottom of the incline the coil is picked up by a truck "A" as indicated in the drawing. After the strip is recoiled on leaving the cold roll mills, the coils drop into a depression in the floor and they are picked up by truck "B" with its ram lowered to its lowest position. This truck delivers the coil to the scale, backs away and then moves forward to pick up the coil at the side of the one just delivered, the former coil having been weighed while the coil that preceded it was being taken from the scale to the shear stock pile. The third truck "C" carries the coils from the stock pile to the rotary shears.

The average truckload is 2 to 5 tons. The average distances loads are carried are—truck "A" 75 to 200 ft., truck "B" 50 to 100 ft. and truck "C" 100 ft. Truck "A" travels approximately seven miles in 24 hours. In addition to the forward travel, there is considerable backing to make necessary turns. The average traveling time of each truck for round trip is eight minutes.

With recent schedules each truck handles approximately 200 to 300, two to five ton coils, or 480 to 1000 tons in 24 hours. These coils are 24 to 74 in. long, 30 to 40 in. outside diameter and 24 in. inside

diameter. The trucks, since they were placed in operation Aug. 12, 1935, have worked continuously for a period equivalent to over 10 months of 8-hour days.

The trucks, which are of the 4-wheel drive and 4-wheel steer type, were built by the Elwell-Parker Electric Co., Cleveland. They are operated with gas-electric power units. Each truck is fitted with a

72-in. long ram which elevates from a minimum height of 11 in. above the floor to a maximum height of 60 in. The trucks are approximately 15 ft. long, 4½ ft. wide and 7½ ft. in height to the top of the elevator uprights. The speed of travel is 4½ miles per hour, and the trucks will elevate six-ton loads at eight ft. per minute.

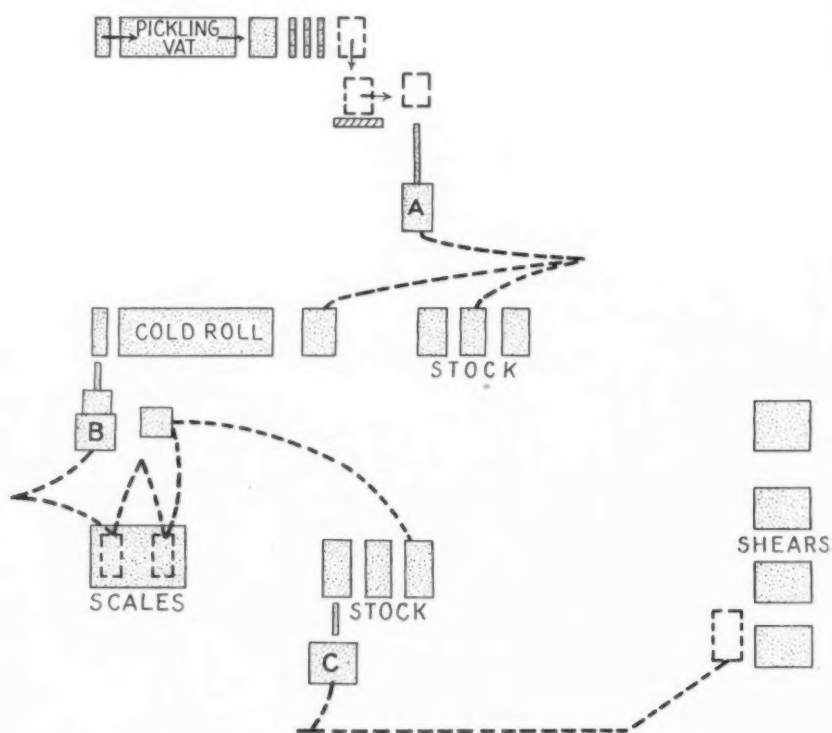
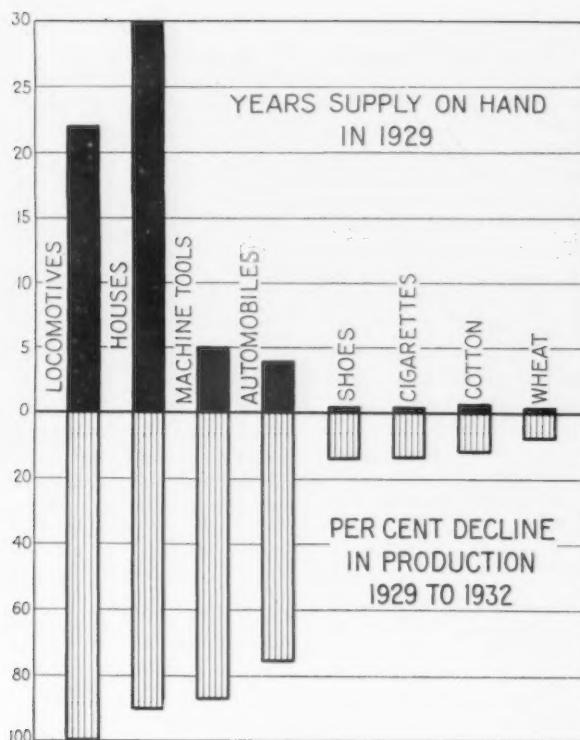


DIAGRAM showing the path followed by the trucks in handling strip coils.



Labor Represents Large Part Of Automobile Cost

BASIC raw materials, such as iron ore, copper ore, wood and cotton, which go into the manufacture of an automobile, are worth probably less than \$25, according to a statement made by John W. Scoville, chief statistician, Chrysler Corp., in an address before the Econometric Society on the "Behavior of the Automobile Industry in the Depression." In this address, which has been published in pamphlet form by the Chrysler Corp., Mr. Scoville points out that the selling price of an automobile depends on wages rather than the cost of the materials which go into it, since nearly

all the money spent for an automobile is paid out in wages.

"Wages," says Mr. Scoville, "are paid to copper miners, and coal miners, to railroad employees, to steel workers, to the workmen who build and design the machines used in the factories, to textile workers, to farmers who grow cotton, to the people who grow, mine, transport and process the materials that go to make up an automobile. I suppose that over 70 per cent of the money paid for an automobile has already been spent for wages—and about three-quarters of these wage payments have been made to workmen outside the automobile factories."

Automobile workers have always secured higher wages than the average for all factory workers. In

1935 this advantage amounted to 30 per cent. It has been the policy of motor car manufacturers to pay as high a wage as possible, without ignoring the interests of the consuming public. Mr. Scoville estimates that about 8,000,000, or one-sixth, of the gainfully employed are associated in some way with the production of the automobile, and that nearly 5,000,000 of these are extra jobs; that is, not in existence before the development of the motor car.

Motor car production literally collapsed during the depression, plunging from a maximum of 5,500,000 cars in 1929 to less than 1,500,000 in 1932. In every State the high point in sales was reached in 1929, declined in 1930 and hit bottom in 1932. Judged by sales,

Mr. Scoville's figures indicate that the States in the Eastern industrial and urban areas suffered less from the depression than those States which are devoted to mining and agriculture. A comparable situation existed throughout the world, for in Great Britain, which is industrial, sales declined less than in Australia and Brazil.

Rural areas, however, have shown the greatest recovery since 1932. In 1932 the per cent of passenger cars sold in metropolitan counties reached a maximum and the per cent sold in the rural counties reached a minimum. In occupational groups farmers and artisans suffered most in the depression, judging again from automobile sales, while the professional groups suffered least. Mr. Scoville's explanation of this statement is that many professional people, such as school teachers, doctors, lawyers and clergymen, had a fairly constant income throughout the depression which, due to the decreased cost of food, rent and clothing, gave them more purchasing power than in 1929.

Seasonal Fluctuations Aggravated

Seasonal fluctuation in the automobile industry was greatly aggravated during the depression. A real effort is being made to stabilize employment by bringing out new models earlier, building up reserves of spare parts during the slack season and stocking dealers with cars during the winter months. It will be interesting to notice the results of the new procedure of introducing new models in November.

The key to the great fluctuation in automobile output, according to Mr. Scoville, is scrapping of old cars. In good times many cars, over 3,000,000 annually, are scrapped and new purchases made, but in depression times the old car

is made to last a little longer. While the production of automobiles was greatly reduced during the depression, consumption, or use of cars, decreased very little.

One of the most interesting phases of this study is the reference to unused mileage in the hands of car owners. Mr. Scoville assumes a new car to be good for about 77,500 miles of travel. On Jan. 1, 1930, unused mileage to the amount of 1067 billion miles of travel was available to car owners. When the depression was on the wane, however, this figure had shrunk to 671 billion miles. It can readily be seen that car sales fell off so drastically during the depression because existing cars were able to provide so much unused mileage.

Mr. Scoville, in considering the statement that in the depression agriculture continued producing and suffered a terrific loss in lowered prices while industry cut production to maintain prices says, that "the first thing that is wrong with this statement is the implication that all industries curtailed output greatly, when the facts are that it was only in certain specific industries that output fell drastically. The second thing wrong . . . is the implication that industrialists purposely reduced output when the facts are that whatever reductions took place in industrial production were caused by the unwillingness or inability of the public to buy products. The third thing wrong . . . is the claim that output was curtailed in order to maintain prices."

In an accompanying chart, Mr. Scoville estimates the supply of goods on hand in 1929, measured in terms of the amount consumed in a year. The bars below the line show the percentage drop in production from 1929 to 1932. The

old theory of the "towering surpluses" which existed in agriculture is disproved and may be seen to have existed in industry rather than in agriculture. He goes on to point out that "while in 1929 we had about a four months' supply of wheat and perhaps an eight months' supply of cotton on hand, we had a four years' supply of automobiles, a five years' supply of machine tools' a 30 years' supply of houses and more than a 20 years' supply of locomotives. Measured in terms of a year's consumption, the housing surplus was at least 60 times as great as the agricultural surplus."

Automobile prices are comparatively rigid and have a chronic tendency to decline. From 1915 to 1919 agricultural prices were so flexible that they increased by 113 per cent and all commodities increased by 100 per cent, whereas automobile prices increased by only 35 per cent. While farm prices increased from 1921 to 1929 and then fell abruptly, automobile prices declined in 10 of the 13 years from 1920 to 1933.

"The claim that automobile manufacturers reduced output in order to maintain prices," Mr. Scoville says, "carries us outside the domain of overt acts into the realm of motives and intent. What evidence has been adduced to prove such motives? So far as I know, none. The millions of dollars spent in advertising and sales promotion would indicate that the manufacturers were vitally interested in maintaining production. Prices were considerably reduced in the depression as I have shown, and a considerable percentage of manufacturers failed. A further reduction in prices would have meant additional failures, and a factory that has closed down because the cash has been exhausted is not a source of employment."



Regularity of Sales Contacts Is Emphasized In Selling of Machine Tools

THAT successful sales effort, at least as related to machine tools, is possibly more dependent upon regularity of contacts than upon any other one element, seems to be borne out by some interesting facts compiled by a peculiarly analytical sales manager in studying contrasted sales policies. In various areas and under the control of this sales manager is a force of some 12 men operating in well-defined but rather large territories. It is a duty of each member of the force to report weekly all calls made and the status of each quotation outstanding. He is also required to report every machine tool sale of which he has knowledge, made in his territory, whether in competition with the products he has to offer or not. His personal opinion as to why he was not successful in securing any particular order which may have gone to a competitor is likewise required. These reports are tabulated in compact form and carried in a convenient holding frame on the sales manager's desk for instant inspection at any time. There is little stretching of facts in saying that the business of the corporation is conducted under determinations reached through what is revealed by the developments tabulated.

It is only normal that the reaction to so precise a check on each member of the sales force should cause a query as to how the men respond to exacting of such detailed information. The sales manager's response was to bring out a record of "lost sales" tabulated over a period of five years preceding the adoption of the existing system. The record of gain from consistency of contacts was undeniable. It showed that in original prospects lost to competition, 85 per cent of the instances involved had not been called upon by a company representative in six months, and the breakdown of the 85 per cent proved two months' neglect to be a bad mistake. The tabulations further revealed that the corporation enjoyed the greatest amount of business from certain allied industries with which salesmen were the most familiar because of knowledge of products, and that calls were the most regular within such industries.

Aiming to build up a wider industrial familiarity, the company entered subscriptions to trade papers for its salesmen, covering

industries peculiar to each man's territory but not necessarily allied with machine tools. The sales manager reported a marked increase in new accounts within six months and an improved entree into shops which had previously more or less "belonged" to competition.

"The class of information which

we have developed in this way has made each of our men a better qualified salesman and has resulted in far less inclination to devote too much time to 'pet' shops. To do the job as I would like to see it done, smaller territories are necessary and this is the problem before us at all times, for after all salesmen are human and cannot be in several places at one time. To carry out a closer combing of areas we now utilize dealer services where we can arrange to co-operate with the type of dealer who ranks up to our standards."

LETTER TO THE EDITOR

The Ford Engine Reconditioning Plan

Editor,
THE IRON AGE

THIS refers to the article by John Allen Murphy, and particularly the reference to the Ford V-8 reconditioned engine exchange plan on page 42 of THE IRON AGE for March 5.

This reference is in error in several respects.

The statement is made that a Ford V-8 owner may have "another motor that has just been fully rebuilt at the same cost as he would have to pay to have his own revamped."

The facts are that a reconditioned Ford V-8 cylinder assembly is priced at \$56 f.o.b. nearest Ford Branch, with charges slightly higher on the Pacific Coast. A complete engine overhaul by a service garage would cost considerably more. Furthermore, in most cases it would be impossible for a service garage, even if equipped with most modern tools, to equal the reconditioning job performed on a V-8 engine at the Rouge Plant, where tools and other equipment similar to those used in original manufacture are used.

In this respect, it is worthwhile pointing out that not only the reconditioned engine, but also the other reconditioned parts available under this plan, including the generator assembly, generator armature, distributor, carburetor, fuel pump, shock absorbers, brake shoes, clutch disc assembly and clutch pressure plate assembly,

must, after being reconditioned, meet similar stringent tolerances and other inspection requirements as new parts.

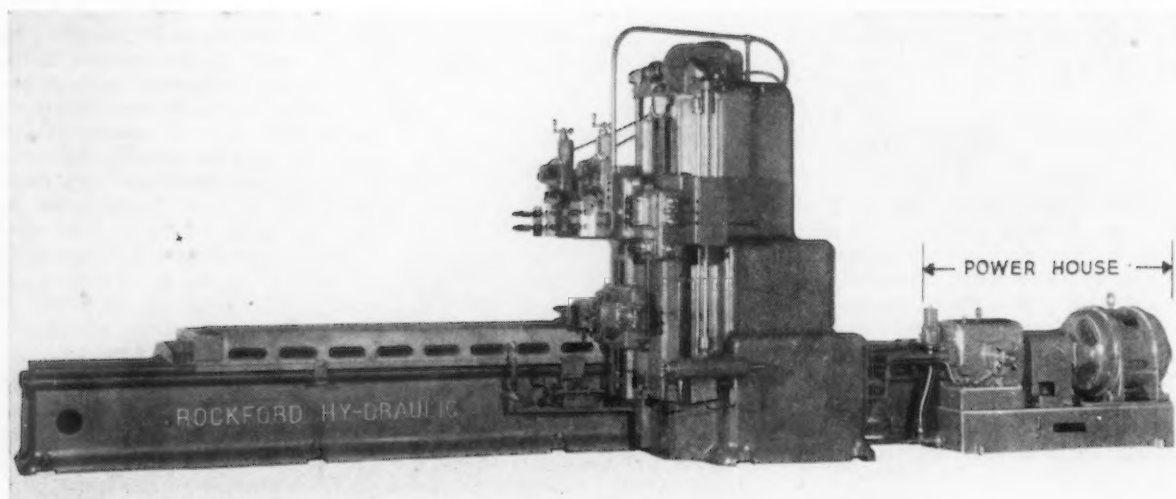
Your attention is also called to the further statement that a reconditioned engine can be installed "in an hour or so." This is rather an underestimate. The time required is usually five to seven hours.

The worst inaccuracy was the statement in the next paragraph that "service stations rebuild these old motors during spare time." This is not true. The motors are returned to the Ford Rouge Plant at Dearborn, Mich., for reconditioning where a complete department, equipped with tools and other facilities similar to those used in the manufacture of the engine originally, was installed at the time the exchange plan was put in operation in 1933.

Yours very truly,

HOWARD K. GANDELOT,
Automotive Engineer,
For N. W. Ayer & Son,
Inc.

Japanese manufacturers are endeavoring to establish themselves in the New Zealand tin plate market, according to a report from Consul General George A. Bucklin, Wellington. A shipment of 90 tons of tin plate was received recently from Japan at a slightly higher landed cost than the English product. It is understood, however, that Japanese shippers have indicated a willingness to lower prices in order to gain a foothold in the market. Great Britain at present supplies most of the tin plate.



Hydraulic Power Applied to Planer Operation

APPPLICATION of hydraulic pressures for reciprocating work tables and for feeding machine tool heads has been a consistent development, through shaper and shaper-planer equipment, and is now well illustrated in a new hydraulic planer built by the Rockford Machine Tool Co., Rockford, Ill., which has been a pioneering organization in the machine tool utilization of this power.

Hydraulic power so used has numerous specified advantages; it eliminates heavy reciprocating or rocking parts, linkages and gears from table drive; it simplifies construction and provides for direct use of power; it produces a powerful and steady cutting stroke, easily adjusted to any desired rate within the capacity of the particular hydraulic equipment; table reversals occur without shock and cutting speed reaches an established rate almost instantly and remains constant.

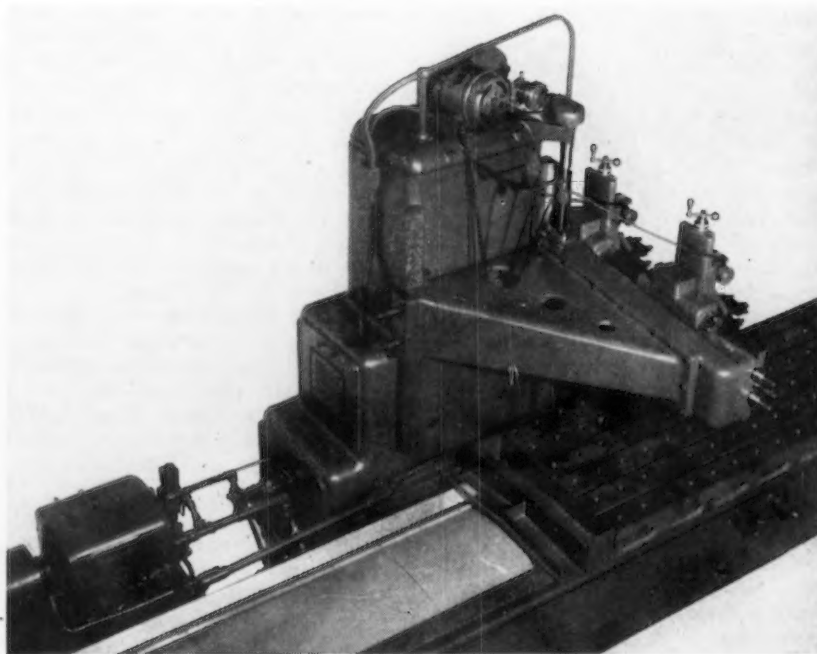
Hydraulic pressures for feeding heads are likewise adjustable and easily controlled within machine capacity. An admirable illustration of power application is supplied through reference to the "power house" shown at the right-hand end of the bed, Fig. 1. Included are the main driving motor and a direct-connected hydraulic power unit; these are mounted on a heavy integral base, reducing complications in connections, accessibility and ventilation. Handwheels on either side of the unit provide easy adjustment of cutting speeds and rapid return rate.

A box-section bed has heavy rib-

bing throughout and is of double length. The table is also of box-section construction and has numerous provisions for rapid planer work such as raised clean-out openings, large chip-pocket and tool tray, and customary T-slots, hold-downs, adjustable control dogs and double wipers for both ways. Design is such that the table never overhangs the bed.

A massive column, rising from

the center of the bed, supports the cross-rail and houses the electric and hydraulic control panels. A motor-driven mechanism is mounted on top of the column and provides rapid traverse to all heads and power elevation for the rail. Details of construction are shown in Fig. 2, where R-1, R-2 and R-3, point out the inverted-L form of the large casting. This casting includes in one piece, the cross-rail and its long, wide, vertical bearing on the column. Mounted on the slide is the side-head rail which is pivoted at its upper end and, at its lower end is provided with fine adjustment. The assembly affords a permanent means for aligning the



THE integral "power house" source of hydraulic power as applied to planer operations is shown at the top, Fig. 1. A closer view of operating provisions is presented directly above, Fig. 3.

side-head rail. Convenience and centralization of operating controls are also shown in Fig. 2. On the Fig. 3 side of the machine duplicate controls are shown, as are features of open side construction; box-section cross-rail back brace and lock bolts and tapered gib.

It will be noted that a heavy sheet metal cover extends the length of the bed underneath the table.

Power rapid traverse is provided for both rail-heads in both directions. The side head has vertical power rapid traverse.

Maximum pull to the table is 24,000 lb. Table length is optional, 12 to 22 ft. Width of table is 36 or 42 in.

Improved Portable Electric Tools

AN electric heat gun, designated as No. U-26, has been added to the electric tool lines of the Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago. The device involves instantaneous heat, generated to a maximum temperature of 400 deg. and heated air, forced through a nozzle at high velocity. Various types of nozzle equipment provide for reaching difficult locations.

The company also announces other additions to its "Thor" line. These include a new portable electric polisher and a new portable electric sander. An improved, one-hand electric screw-driver is capable of driving all screws, from No. 4 to No. 12, by simply changing the finder and bit. The driver is 10½ in. long and has its weight concentrated at the operator's hand rather than overhanging.

Air Separator Design For Sandblast Mask

APUROLATOR air separator, by Motor Improvements, Inc., 365 Frelinghuysen Avenue, Newark, N. J., has been especially designed for the sand-blast operator's mask. The device involves a filtering element of brass and a special alloy of bronze, inclosed in a metal case. The element surface is made of alloy-bronze ribbon, wedge-shaped in cross sections, and having rises 0.0005 in. high placed at

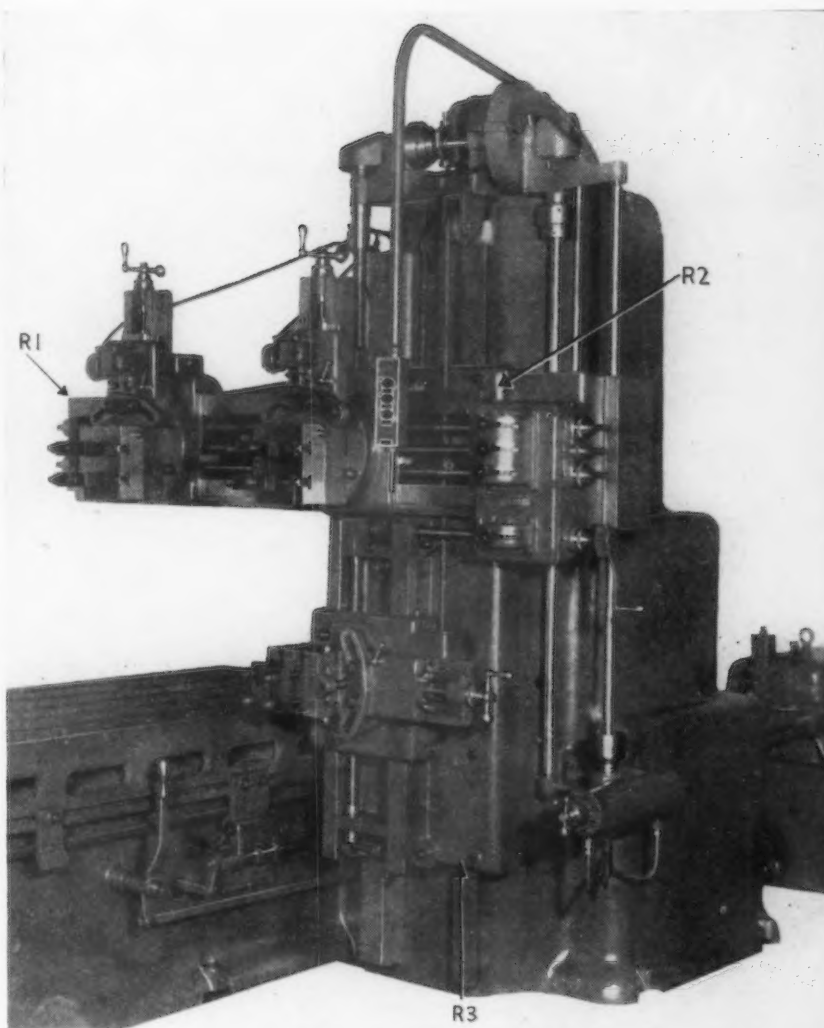


FIG. 2—Further details of hydraulic planer construction and control, including an outlining of the inverted-L form of the large rails casting as described, are shown here.

intervals of ⅛ in. on one side of the ribbon. The other side is smooth. The ribbon is wound in a spiral around a brass cylinder having fluted sides. The design provides that the ribbon standing on edge, and with its spirals separated by the rises, forms a series of slots, each with a width of 0.0005 in. and a length of approximately ⅛ in.

As compressed air enters the case it strikes the walls of the case and the external surface of the filtering element. These parts act as baffles and remove some of the oil and water to a sump in the bottom of the case. The additional and greater part of separation takes place while the air is passing through the filtering slots. There are 26,766 of these slots and their sharp edges are said to sheer and remove even microscopic drops of oil and water.

A fume removal space within the body cylinder is filled with approximately one-half pound of activated carbon. A sixty-mesh screen and

wool cap is placed at the top of the cylinder to prevent the entrance of carbon particles into the air line. The carbon requires replacement every six months. Convenience for refilling and for cleansing is a feature.

Semi-Automatic or Hand Operated Miller

THE U. S. Tool Co., Inc., Ampere, N. J., has announced a new milling machine designed to serve either in semi-automatic capacity for production work, or as a regulation hand miller for small quantities and miscellaneous work. The power feed table is cam operated; changes of table speeds and direction are controlled by a single cam and lever. Hand feed is effected through a convenient hand lever and affords the utility of a hand miller with horizontal feed.



Improvements in Production

New "Motodrive" Unit Uses Any Standard Make of Motor

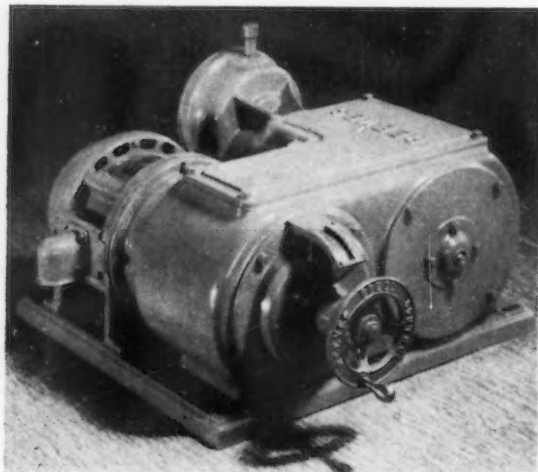
SPEED variation as provided through a "Motodrive" unit built by the Reeves Pulley Co., Columbus, Ind., is infinite between predetermined limits. Manual turning of a convenient handwheel, forward or backward, provides, progressively, either more or less speed for a driven machine. A convenient dial indicator registers speeds on a scale calibrated from 1 to 6.

Motodrive combines features of both the variable speed transmission and the vari-speed motor pulley outfits manufactured by this

company. It utilizes the mechanical principle of a V-belt running between two sets of cone-faced disks which are adjustable in diameter and mounted on parallel shafts. One shaft receives power at constant speed from the motor and the other shaft transmits power at infinitely adjustable speeds to the driven machine. The V-belt used has been developed exclusively for the purposes of this particular drive. A system of thorough ventilation to maintain uniformly efficient temperatures of motor and variable speed mechanism and

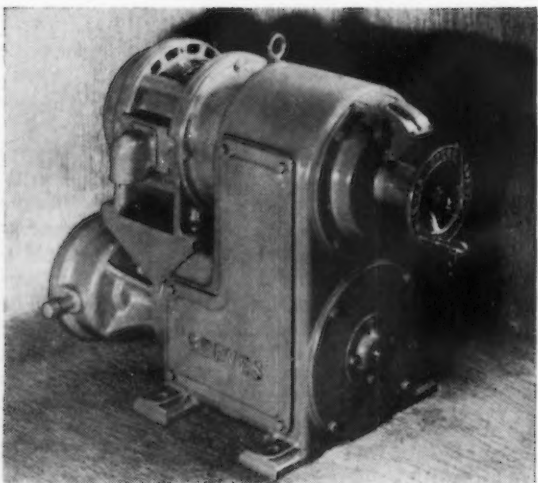
forced feed lubrication are included in unit design. The variable speed shaft may be extended on either side of the unit as required.

Both horizontal and vertical designs are available, as illustrated. Each design is built in four sizes which take motors from $\frac{1}{4}$ to $7\frac{1}{2}$ -hp. capacities, and which cover speed ratios from 2:1 through 6:1. Reduction units of helical gear type in ratios up to and including 189:1 may be incorporated in the drive. In different combinations of sizes, ratios and reduction gears, output speeds ranging from a minimum of 1.35 r.p.m. to a maximum of 3480 r.p.m. may be obtained. Such a broad selection of motor speeds, ratios of speed variation and reduction ratios meets practically all variable speed requirements up to $7\frac{1}{2}$ -hp. capacities. Units may, within certain limitations, be mounted on wall, floor or ceiling as well as directly on the driven machine.



AT LEFT

A NEW variable-speed unit for motor driven machines combines principles which have been employed for some time in other types of Reeves "infinitely variable" speed mechanisms.

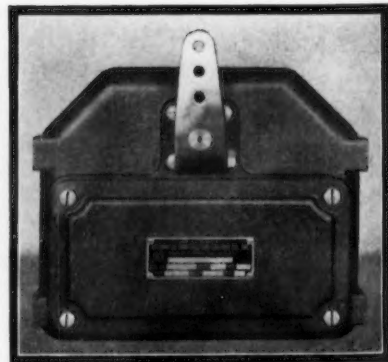


AT RIGHT

A SPECIAL relay, in connection with a new compact furnace temperature control instrument, provides for quicker response to repositioning demand.

Accurate Furnace Temperature Control

THROUGH new "Relatrol" and balancer controllers, the position of control valves or dampers is said to be determined with precision, and with a minimum disturbance to furnace atmosphere. The equipment is announced by the Automatic Temperature Control Co., Inc., 34 East Logan Street, Philadelphia. The illustration shows the external appearance of both units. Each unit produces a corrective





movement in a valve or damper in exact relation to departure from the temperature setting as measured by the actuating instrument. A special relay is supplied, wired to the circuit between the actuating instrument and the motor mechanism. This relay embodies an electrically controlled null-point, and as a full-line voltage is used in both relay and power motor, extra responsiveness is secured to repositioning demand. The mechanism is housed in a cast-iron case designed to withstand rough usage. The balancer differs from the relatrol in that it is provided with automatic means of load compensation; its use is preferred where load changes will be of considerable extent and duration.

Improved Automatic Drilling Unit

IMPROVEMENTS in a No. 3 automatic drilling unit, built by Millholland Sales & Machine Co., Indianapolis, Ind., permit following new specifications for the unit. With a three-inch stroke, and drill capacity up to 1 1/16 in. in steel, motor requirements are from 1 to 3 hp. Cam feed parts are strengthened to provide for increased capacity. Quill bushings have been lengthened to give greater spindle rigidity, and the spindle quill is provided with overhead support from return cylinder piston rod which is piloted in the front and back bushings of the return cylinder. An individually motor driven low pressure pumping unit and storage tank will maintain proper pressure on a number of units. The return cylinder is brass lined and all parts made of non-corrosive metals to permit of the use of air pressure if desired rather than the new low, 75 lb., hydraulic pressure. Camming permits cycle operations up to 60 per min. or down to 1 min. or more per cycle. Cams and feed gears are readily changed, being in pick-off position within cast iron covers. Mounting can be horizontal, vertical or angular. Mounting dimensions are the same as for previous models thus providing that former units may be replaced by the new.

Special Horizontal Grinder Operations On Either Single or Tandem Units

TWO special applications of Osterholm horizontal grinders, as built by Williams, White & Co., Moline, Ill., are illustrated. The single machine is adapted for grinding pan rail surfaces in small production. The second machine, tandem, is designed for a production of 150 to 175 cylinder blocks per hr. with high limit of accuracy 0.003 in. checked to a surface plate. The chain feed has a predetermined rate of speed and supplies continuous feed. The wheel mount is positioned so that the wheel cuts

on both edges, giving a double cut on the single machine and four cuts on the tandem set-up. Linear feed is variable between 12 and 72 in. per min. Complete electrical controls are within convenient reach of the operator. The tandem principle provides that any number of wheels may be arranged in a single frame. The equipment can be universally arranged for flat grinding from the rough where single operations are required; where parallel surfaces are to be ground, fixtures are necessary.



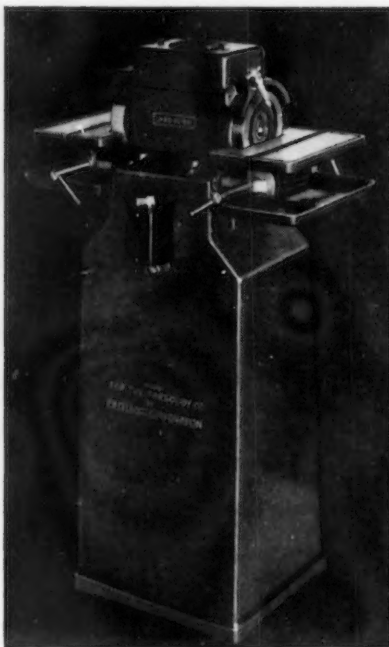
THE installation of tandem assemblies of horizontal grinding machines, as illustrated, has served to materially widen the range of unit equipment work and to lessen required floor space in a large production plant.





DETAILED grinding requirements, necessary to the sharpening and maintenance of cemented carbide tool tips, have been worked out in two new grinders described below.

CONVENIENCE, permitting quick completion of carbide tip conditioning, is illustrated in views of 6 and 10-in. models recently announced.



New Grinders for Cemented Carbide Tools

NEW pedestal grinders, 6 and 10 in., for rapid reconditioning, reshaping, and original grinding on milled and brazed carbide tool blanks, are announced by Carboloy Co., Inc., Detroit. The machines are built by Ex-Cell-O Aircraft & Tool Corp., Detroit.

The 6-in. machine is designed for interchangeable use of silicon carbide cup wheels, diamond wheels, and lapping disks. It is intended for plants having carbide tools in the smaller size range, up to $\frac{3}{4}$ in. square, and a few larger sizes. It supplements the 10-in. grinder for plants wherein tools require reconditioning on diamond wheels or lapping disks. For such work all sizes of tools can be taken care of. The 10-in. machine is for both peripheral grinding on silicon carbide straight wheels, and face grinding on like cup wheels. Both roughing and finishing operations are done on the one machine.

Simple means expose all wheels for changing; V-belts are accessible for quick adjustments, and outlets are conveniently attached to blower systems. Tool rest tables are of hardened and ground semi-steel, are of ample size, and extend beyond the face of cup wheels and around the periphery. Graduated protractors for accurate setting of

tables to 20 deg. above or below horizontal are provided.

Reversible motors, mounted within pedestals, facilitate grinding of either right or left-hand tools.

Tractor Crankshafts Machined Automatically

THE automatic duplex-type crankshaft lathe shown in the accompanying illustration is being marketed by Wickes Brothers, Saginaw, Mich., for machining heavy Diesel and heavy tractor type crankshafts. The working cycle is entirely automatic. It provides for rapid traverse of tools to

the cutting position; coarse cheeking feed; fine turning feed; and dwell, in which the cutting tools are held in a definite position for five or six revolutions of the crankshaft in order to clean up the cut. Continuing, the automatic cycle includes diameter stop; rapid traverse of tools to the unloading position; and stopping of the lathe in the unloading position. After chucking the crankshaft, the operator is merely required to depress the electrical start button, the machine then going through the entire work cycle as described.

Most of the bearings in the machine are of anti-friction type, the main exception being the spindle bearings, which are bronze boxes lined with babbitt. Forced feed lubrication is provided throughout.

The lathe illustrated is set up for cheeking, turning and filleting of Nos. 1 and 4 crankpins on a Diesel crank. Additional length of bed was provided in order to accommodate longer six-throw and eight-throw crankshafts. The machine, the model DA-8, is driven by a 20-hp. variable-speed d-c. motor through multiple V-belts. With electrical equipment, it weighs 28,000 lb.

Magnetic Clutch Brake Lining Record

A MAGNETIC clutch brake of special combination design, developed by the Magnetic Mfg. Co., Milwaukee, Wis., has recently recorded a service of over sixteen million engagements and disengagements without replacement of linings. The brake is mechanically operated through springs and is said to be positive even in event of interruption in electric current. Smooth acceleration was essential in the work covered by the clutch action record. A new installation is approximately 24 in. in diameter, developing a clutch torque of 4500 lb.-ft. and a brake torque of 1500 lb.-ft.



The Metallization of Machine Elements

(CONCLUDED FROM PAGE 33)

Sample No. 13, 1-in. diameter bar stock, shown in Fig. 4, was sand blasted and coated with tin. At the end of 6 hr. in the salt spray this piece was removed and examined, and it was found that rust was evident in pin points. This rust progressed as the time in the salt spray increased. These round pieces were sprayed while leaning against a wall, and the nature of the rust indicates that the rusted portion was not covered by a coating of sufficient thickness. They should have been coated in a lathe.

Sample No. 14, of 1-in. round stock, was sand blasted and given a coating of cadmium. No rust was evident on this sample during the entire period it was exposed to the salt spray.

Sample No. 15, of 1-in. round stock, was sand blasted and coated with zinc. This specimen performed in the salt spray in the same manner as did the samples coated with zinc as previously discussed.

Sample No. 16 was of 1-in. diameter round stock, coated with stainless steel of the 18 and 8 type. This sample rusted very rapidly and was removed after 12 hr. exposure in the salt spray. The sample was again sand blasted and metallized with a thicker coat of stainless steel in an effort to produce an impregnable coating. However, when replaced in the salt spray, the corrosive action of the salt spray was not impeded by this thicker coating.

Samples 17, 18, 19 and 20, were of 1-in. square stock and were coated with tin, cadmium, zinc, and stainless steel of the 18 and 8 type respectively. The behavior of these four samples in the salt spray was identical with that of the four preceding samples; that is, the shape of the piece had little or no effect upon the ability of the coating to resist corrosion in the salt spray.

Sample No. 21 was a sand blasted plate which received a coating of lead. At the end of a 6-hr. period no corrosion was evident. The same held true at the end of a 12-hr. period. The sample was then allowed to remain in the salt spray for 120 hr. Examinations at the end of this period disclosed a very

slight rust. Upon removal from the salt spray at the end of 360 hr., rust had progressed slightly and the lead coating was discolored.

Sample No. 22, a sand blasted plate, was coated with copper. As shown in Fig 5, rust became evident upon the plated surface almost immediately after being placed in the spray. In fact, the presence of the copper coating seemed to accelerate corrosion rather than inhibit it. This rusting action progressed rapidly, and upon removal from the salt spray at the end of a 360-hr. period, the copper coating had been almost completely eaten away and the steel beneath was deeply pitted.

Sample No. 23 received a coating of aluminum. No rust was noted on this sample throughout its exposure to salt spray, except that when it was removed at the end of 360 hr. a small hole had rusted through the surface of the coating. The presence of this hole was due to the fact that the aluminum coated sample previously had been held over a flame and by capillary action the aluminum beneath the coating of aluminum oxide or hydroxide had formed in a ball. When this ball was broken off a very small hole was left through the surface of the coating.

The order of resistance to corrosion of the coatings tested was (1) zinc, (2) cadmium, (3) aluminum, (4) lead, (5) tin, (6) stainless steel, and (7) copper.

It is difficult to explain the behavior of the stainless steel coatings. Several possibilities present themselves. Due to the extreme porosity of the sprayed metal, the coating might not have completely covered the surface, or part of the protective elements in the stainless steel may have been burned out in spraying.

Illinois Cornfield Becomes Locomotive Works

(CONCLUDED FROM PAGE 40)

welding and a wide range of machine operations resulted in the installation of individual transformers on alternate columns along the entire length of the main aisle on the west. In this way the necessity for installing three or four

substations through the building, each with its own oil-cooled transformers, was avoided and small transformers were provided at 48-ft. intervals with three-phase 440-volt feeders carrying current to the lighting transformers which convert this power into a single-phase 220-volt, with 110-volt secondary.

Measured illumination has been provided throughout the plant by direct lighting. Aluminum reflectors with special non-corrosive finish assure undiminished brightness without excessive maintenance. These reflectors carry 1000-watt lamps on the roof trusses 49 ft. above the working floor in the main aisle.

At the north end of the main building is a testing room where two Winton Diesel engines will be on test at all times. Power generated by these engines is adequate to meet the direct current demands of the plant. Because of the necessity for changing the engines on test at frequent intervals, this section has been fitted with a removable roof and can be served by the two cranes in the machine shop aisle. Adjacent to this engine test room is a locomotive testing pit and the power generated here can likewise be converted into constructive use in the plant. With this source of industrial power and its own complete water supply system, modern sewage disposal plant, fire protection apparatus, and efficient heating plant, the works could operate entirely independent of all public service facilities.

The layout has been designed to accommodate shops four times the present size without augmenting the service facilities. It will permit extension of the plant to double its initial length without necessitating the installation of additional cranes, and duplication of such extended facilities on foundations partially in alongside the west wall of the present building.

A three story and basement office building of modern design serves as business office for the Electromotive Corp. and headquarters for its engineering staff, which has been provided with a drafting room occupying the entire upper floor. A complete Frigidaire air-conditioning system has been installed in the office building, with automatic controls to cool the air in summer and circulate and humidify warm air in winter.



THIS WEEK ON THE ASSEMBLY LINE



... Spring buying of automobiles in unprecedented upturn.

o o o

... Steel makers have difficulty meeting heavy requirements of automotive plants.

o o o

... March sales figures make good reading in Detroit.

o o o

... Automobile manufacturers back safety drives by a wide variety of organizations.

DETROIT, April 13.—An unprecedented upturn in spring business has sent automobile schedules ahead again for the seventh consecutive week. Cram's Reports estimate production for the week ended April 11 at 112,818 units, as against 108,426 the week before, although still somewhat below the corresponding week of last year when 119,562 units were produced.

Steel sellers are feeling the spurt in production by advances in delivery dates on orders placed a few weeks ago. In fact, some mills are finding considerable difficulty in meeting the requirements of the automobile manufacturers who did not anticipate the steady rise in schedules that has taken place. Chrysler, Ford and General Motors units have all been active buyers in the past week, although there are few commitments for material for May delivery. As has been mentioned in these columns before, the car builders have been feeling their way along and setting their schedules up practically on the basis of sales. The way planning depart-

ments are run at present, there isn't a car that comes off the line that has not already been sold.

One enthusiastic sales manager has likened the present demand for motor cars to the rush of water through the flood gates of a dam. With more money in circulation, he believes that the pent-up demand of 1931, 1932 and 1933 is now breaking loose. Undoubtedly bonus money, when it gets into circulation, will sustain motor car sales at a time in early summer when they are usually beginning to fall off. People are so accustomed to individual transportation that they can no longer do without it and many a man will make a down payment on a car before he will pay his rent.

Figures on March sales are beginning to come in and they substantiate previous estimates. Polk estimates new passenger car sales in the United States during March of 300,000 units, based on preliminary reports from 110 principal cities and official returns from 13 states. This rate, if sustained, will give a March figure exceeded only

in 1929 and '30. Last year the March total was 261,477 cars. *Automotive Daily News* estimates March retail sales between 350,000 and 375,000 units, based on General Motors figures, Ford world production and Chrysler estimates.

Complete figures for February official registrations throughout the nation showed a passenger car total of 176,638, an increase, by the way, of 3½ per cent over the February, 1935, figures, although it appeared during the worst of the cold spell that a new February low had been reached. The truck total of 40,301 units was an all-time record for February and even exceeded the January, 1936, total by a few hundred units. Truck sales in March are estimated at 52,000 units, exceeding any previous March figures.

March Sales Figures Make Good Reading

Member companies of the Automobile Manufacturers Association showed a 47 per cent increase in production for March as compared with February and an increase of 16 per cent for the first quarter. March output for the group is estimated at 323,160 cars and trucks as against 280,758 units a year ago. The only company excluded from these figures is Ford Motor, which is estimated to have produced 122,000 units in March. General Motors units showed a gain in March production of 36 per cent over February. Production for the first quarter ran 28½ per cent over the first quarter of 1935. Retail sales in the United States in March were almost double the February figure and for the first quarter showed a gain of 47 per cent over the 1935 quarter. The comparable increase for the month of March is 23 per cent.



Many General Motors units showed spectacular increases. Pontiac retail sales in March were more than double those of February and, in fact, were greater than January and February retail sales combined. To indicate the spurt in spring buying, the last 10-day period in March was bigger than any other 10-day period since April, 1929. Incidentally, Pontiac dealers had the biggest used car month in their history.

Chevrolet sales in March were the highest for any month in the history of the company at 126,119 units and a new record was also set for first quarter sales at 272,149 units, a gain of 56 per cent over the same period last year. Sales of used cars, however, by Chevrolet dealers showed a relative falling off since the ratio was 1.31 in March as against a ratio of 1.77 for the quarter and a ratio of 2.25 in January, when the heat was being put on the used car situation.

Oldsmobile retail sales in March were also greater than for any month in the history of the company and were 11½ per cent over April sales in 1935, the previous record month. April schedules have been set up 20 per cent over that of a year ago which was the big month for Oldsmobile. A six-day week has been instituted, with both day and night shifts. Aside from this lengthening of the work week, there are more persons on the payroll now than have ever been employed before at the Lansing plant.

Buick continues to be the leader in the General Motors family. March retail sales were more than double those of the previous month and showed a gain of 130 per cent over March, 1935. About half the total business came in the final 10-day period which reflects again the spring spurt of buying. As a

By FRANK J. OLIVER
Detroit Editor, *The Iron Age*

result, Buick has stepped up its projected schedule for April for the second time by 2000 units to 18,602 cars.

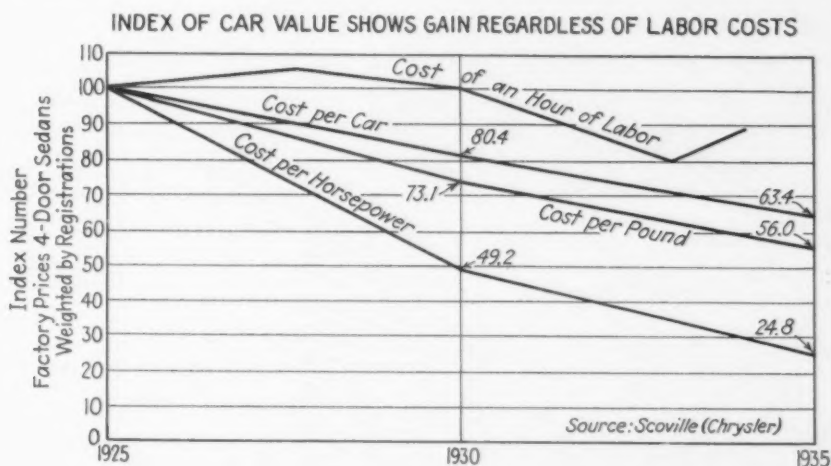
Even the Cadillac-LaSalle division of General Motors has recorded a large increase in retail sales, showing that higher priced cars are finding a readier market. Deliveries for the last 10-day period in March were exceeded only in the boom years of 1928-1929 and total sales for the month were 121 per cent over those of the previous year. Oddly enough, an indication of the fact that the depression is really over is that the biggest relative gains are being made in custom-built 16-cylinder cars up in the \$10,000 class, where orders are five times what they were a year ago.

Employment Stabilized

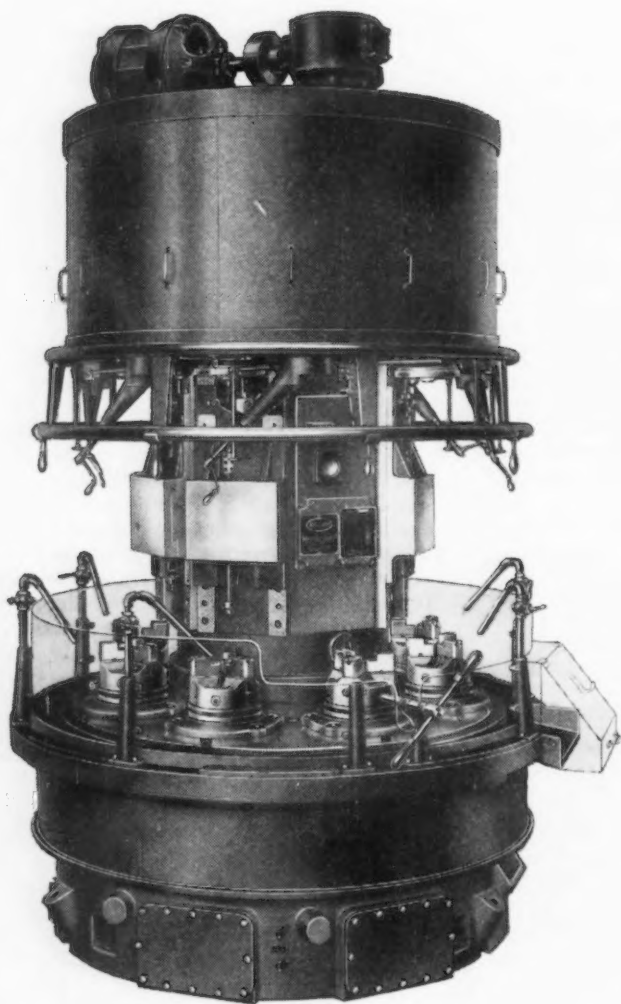
Manufacturers have been able to stabilize employment in the indus-

try very effectively, despite wide fluctuations in production. Since the low point in February, the industrial employment index for Detroit has risen 1½ per cent, while weekly production schedules during the same period rose 80 per cent. The answer is to be found, of course, in increased working hours. For several weeks during February the plants were working two days a week, 7½ hours a day. At present practically all plants are on a five-day basis, some on a six-day, and the working hours per day have been stepped up from 7½ to as much as 9½.

One industry that has not been able to stabilize employment is the tool and die industry. The jobbing shops in this vicinity expected in early January to have a long die production program extending over six or seven months and they so informed their workers. But as the men came around from week to week asking for work they had to be told "Not this week, but maybe next we will get some work to bid on." Only last week did business begin to trickle in to the jobbing tool shops in the way of some work



BULLARD
MULT-AU-MATICS
PRODUCE IT



"Tell your money where to go.
Don't ask it where it went."

BABSON

Type D-MULT-AU-MATIC

LOWER

Cost of
PRODUCTION
for **INCREASED
PROFITS**

•• If you believe it,
then have it. If you doubt
it, let our engineers prove
it on some of your work.

•

THE BULLARD COMPANY
BRIDGEPORT CONNECTICUT

that was let out by Fisher Body, whose own main die shop in Detroit has been busy for the past six weeks. No die business has been let out by Ford, Chrysler or individual General Motors units, although it is expected that this business will break within the next week or so.

One practice of Fisher Body has been practically to lease the facilities of certain die shops on an hourly rate. It is understood, for example, that Fisher Body has contracted for the output of a great deal of the Keller automatic die sinking capacity in this city in recent weeks.

Mechanical Changes to Be Made

While the automobile manufacturers have been having a great deal of difficulty in making up their minds about the body changes for next year, they have not been nearly so backward in preparing for mechanical changes. As has been mentioned before, there are a number of motor changes in the wind and machinery for new motor lines is still in the process of being purchased by such companies as Chevrolet, Oldsmobile and Packard. Chrysler has hardly broken the ice on equipment for its motor line at the East Jefferson Avenue plant, but when it gets going a large volume of machinery orders is anticipated. Chrysler has a habit, however, of rebuilding and retooling what equipment it has, and as soon as decisions are reached on this score, orders should be forthcoming on new equipment.

As if to catch the fever of modernization in neighboring automobile plants, the Burroughs Adding Machine Co. has started on a very impressive modernization program after years of inactivity. Automatic screw machines, milling machines, tool room equipment and punch presses have been the principal

items purchased. Some of this machinery replaces equipment the builders of which had passed out of existence 30 or more years ago. Burroughs showed a nice profit for 1935 and has a sizable surplus on which it can draw for such purposes.

Highway Safety

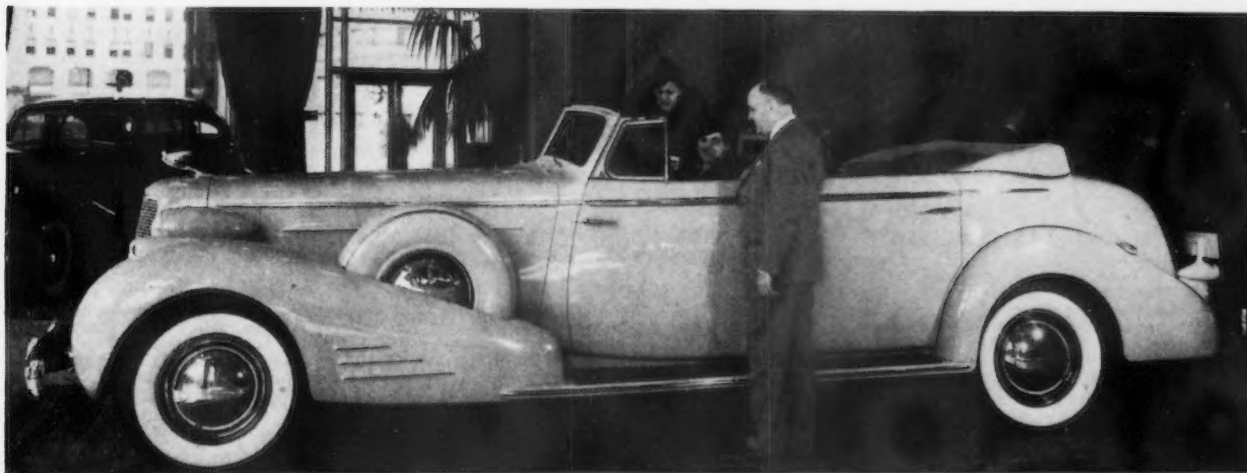
An unusual example of trade association cooperation is found in the present program of the Automobile Manufacturers Association to promote highway safety. The industry is keenly aware of its responsibility in the matter of mounting deaths from automobiles and has recently been taking steps toward the coordination of efforts to bring about tangible results in the reduction of highway accidents. It is almost unprecedented in the history of trade associations to find a manufacturers' group donating large sums of money to other groups outside its jurisdiction simply because those groups lack funds to carry on a broad related program.

Last week in Detroit a meeting was held at which progress reports were presented by the groups whose efforts are being coordinated by the A.M.A. The plan has been to take existing organizations and make them more effective. Rapid progress is expected in informing and educating the general public through representative groups such as the American Legion, the General Federation of Women's Clubs, the National Grange, the National Congress of Parents and Teachers and the American Automobile Association. These groups have been handed certain sums with no strings attached and the A.M.A. has merely acted in the capacity of suggesting where such funds might be expended most usefully and coordinating the programs so as to avoid overlapping.

This particular part of the program is largely a matter of education. Other groups that are being assisted through actual cash contributions are the International Association of Chiefs of Police, the American Association of Motor Vehicle Administrators and the American Association of State Highway Officials. With this financial aid, the Chiefs of Police, for example, have been able to send around the country a director of safety whose purpose is to set up traffic clinics in various cities, such as the one in Evanston, Ill., which has been so successful in reducing accidents. The A.M.A. has also given a special grant to the Traffic Officers Training School at Northwestern University and has given a substantial endowment to the Harvard Bureau for Street Traffic Research. Incidentally, other related groups such as the tire manufacturers, the parts manufacturers and the finance companies have also contributed what funds they had available to the A.M.A., since after all, their futures are as much at stake as the manufacturers', if steps are not taken to prevent the automobile from being classified as a death-dealing instrument.

The Highway Education Board, which is also being aided by the A.M.A., is conducting essay contests in the public schools. Already several states are making it a requirement for graduation from high school that a student have 20 hr. of driving practice plus classroom instruction. Some of the motor car companies themselves have donated automobiles to states and communities for proper driving demonstration purposes. It is understood that the Ford Motor Co. has donated a car and an instructor to Bergen County, N. J., to work with the school boards in that area, and will extend the scope of this work to other communities.

HAPPY DAYS! That it is no longer popular to brag about how poor you are is evident when Cadillac announces a five-fold increase in the sale of V-16 custom built jobs; puts on a display featuring ultra-luxurious \$10,000 models on a 154-in. wheel-base chassis, the longest in America.



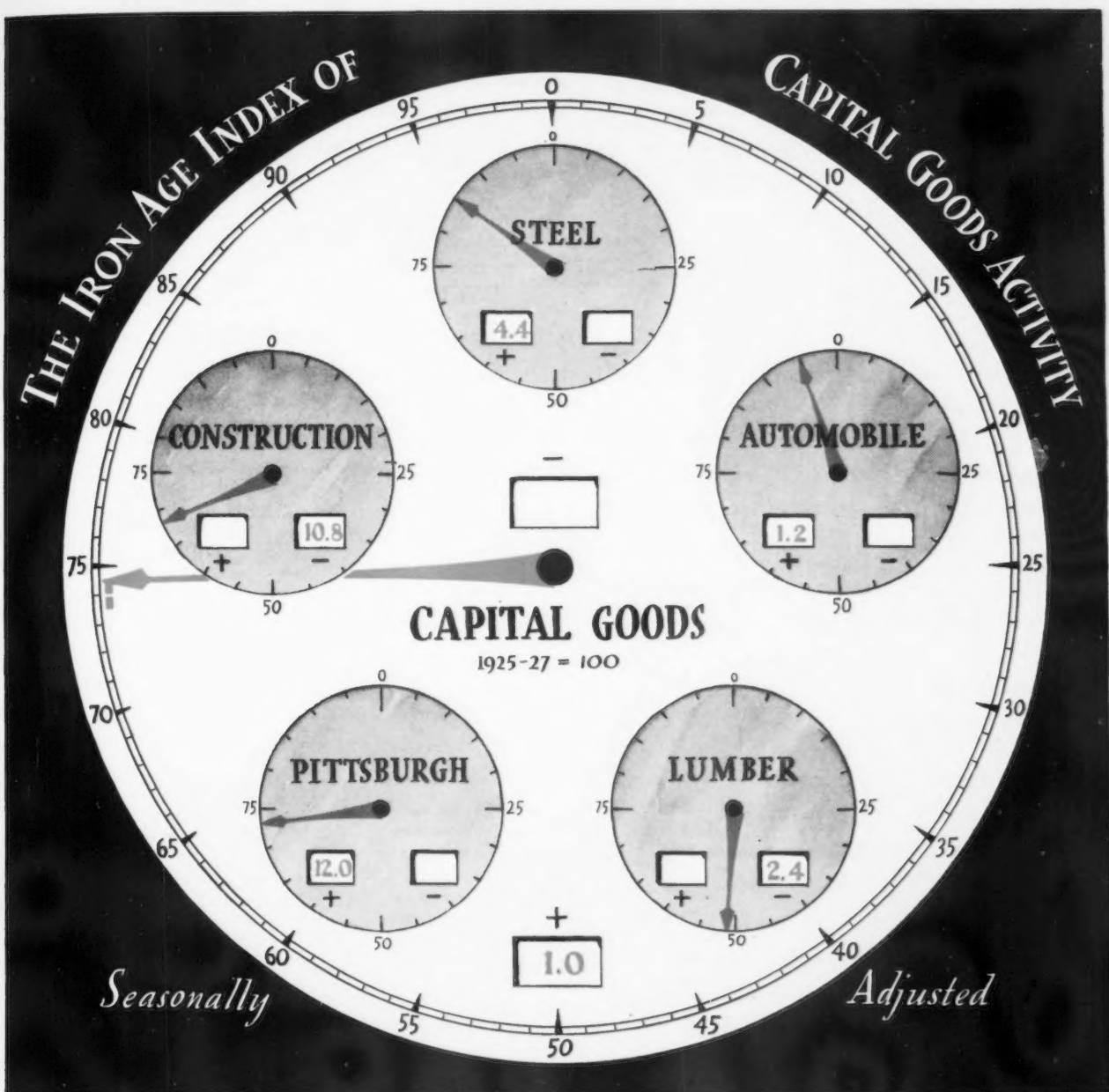
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	March, 1936	February, 1936	March, 1935	Three Months 1935	Three Months 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a		2,632,306	2,582,986	7,330,648	.....
Coke production (net tons) ^b		3,293,542	3,012,692	8,775,676	.....
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,040,311	*1,823,706	1,770,028	4,855,916	5,889,902
Pig iron output—daily (gross tons) ^c	65,816	*62,886	57,098	53,955	64,724
Castings:					
Malleable castings—production (net tons) ^d		40,449	42,808	127,585	.....
Malleable castings—orders (net tons) ^d		38,110	40,237	126,030	.....
Steel castings—production (net tons) ^d		47,954	31,940	90,662	.....
Steel castings—orders (net tons) ^d		51,701	30,723	94,970	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	3,346,489	2,967,803	2,868,141	8,517,437	9,363,731
Steel ingot production—daily (gross tons) ^e	128,711	118,712	110,313	110,616	120,048
Steel ingot production—per cent of capacity ^e	58.65	54.09	49.83	49.97	54.70
Finished Steel:					
Trackwork shipments (net tons) ^e		4,116	3,440	8,665	.....
Steel rail orders (gross tons) ^e	62,300	147,450	79,418	210,592	424,291
Sheet steel sales (net tons) ^e		138,244	193,057	698,210	.....
Sheet steel production (net tons) ^e		191,359	227,082	681,858	.....
Fabricated shape orders (net tons) ^e		114,545	102,325	242,472	.....
Fabricated shape shipments (net tons) ^e		69,855	85,132	243,286	.....
Fabricated plate orders (net tons) ^d		27,830	16,832	50,674	.....
Reinforcing bar awards (net tons) ^e	24,025	23,830	17,335	57,350	115,665
U. S. Steel Corp'n. shipments (tons) ^b		676,315	668,056	1,785,248	.....
Ohio River steel shipments (net tons) ^f		13,782	75,072	192,097	.....
Fabricated Products:					
Automobile production, U. S. and Canada ^h		304,232	451,768	1,108,941	.....
Construction contracts, 37 Eastern States ⁱ	\$199,028,300	\$142,050,200	\$123,043,500	\$297,864,500	\$545,871,300
Steel barrel shipments (number) ^d		508,974	525,022	1,366,284	.....
Steel furniture shipments (dollars) ^d		\$1,484,145	\$1,220,533	\$3,424,249	.....
Steel boiler orders (sq. ft.) ^d		810,387	647,062	1,322,572	.....
Locomotive orders (number) ^m	13	46	8	9	73
Freight car orders (number) ^m	627	7,236	0	830	8,907
Machine tool index ⁿ		112.1	62.3	†60.3	.....
Foundry equipment index ^o		110.4	69.3	†77.2	.....
Foreign Trade:					
Total iron and steel imports (gross tons) ^p		43,358	21,409	73,098	.....
Imports of pig iron (gross tons) ^p		14,660	2,708	15,482	.....
Imports of all rolled steel (gross tons) ^p		18,208	13,292	40,789	.....
Total iron and steel exports (gross tons) ^p		213,736	323,035	814,312	.....
Exports of all rolled steel (gross tons) ^p		65,947	78,483	219,208	.....
Exports of finished steel (gross tons) ^p		62,322	68,146	193,816	.....
Exports of scrap (gross tons) ^p		142,165	228,338	559,688	.....
British Production:					
British pig iron production (gross tons) ^r	633,600	584,700	554,200	1,558,500	1,814,200
British steel ingot production (gross tons) ^r	980,100	938,500	841,900	2,369,200	2,831,100
Non-Ferrous Metals:					
Lead production (net tons) ^s		34,127	32,921	89,730	.....
Lead shipments (net tons) ^s		33,086	28,973	95,191	.....
Zinc production (net tons) ^t		42,483	36,228	105,338	120,628
Zinc shipments (net tons) ^t		38,159	39,918	111,537	124,545
Deliveries of tin (gross tons) ^v		5,520	5,495	14,000	17,755

†Three months' average. *Revised.

Source of figures: ^aLake Superior Iron Ore Association; ^bBureau of Mines; ^cTHE IRON AGE; ^dBureau of the Census; ^eAmerican Iron and Steel Institute; ^fNational Association of Flat-Rolled Steel Manufacturers; ^gAmerican Institute of Steel Construction; ^hUnited States Steel Corp'n.; ⁱUnited States Engineer, Pittsburgh; ^jWhen preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^kF. W. Dodge Corp.; ^lRailway Age; ^mNational Machine Tool Builders Association; ⁿFoundry Equipment Manufacturers Association; ^oDepartment of Commerce; ^pBritish Iron and Steel Federation; ^qAmerican Bureau of Metal Statistics; ^rAmerican Zinc Institute, Inc.; ^sNew York Commodities Exchange.



Same Week Last Month	Preceding Week	Last Week
75.5	73.5	74.5
74.0	80.7	85.1
86.1	93.4	94.6
56.2	53.9	51.5
69.1	61.1	73.1
93.1	79.5	68.7

COMBINED INDEX
Steel Ingot Production
Automobile Production
Lumber Shipments
Pittsburgh Industrial Production
Heavy Engineering Construction

Same Week 1935	Same Week 1934	Same Week 1933
57.5	60.5	31.5
58.8	62.9	25.0
88.1	74.3	32.8
43.4	64.4	33.2
58.3	63.0	37.7
40.1	38.7	28.7

H EAVY industrial operations, as measured by THE IRON AGE index of capital goods activity, advanced again last week. The rise amounted to one point, and established the index at 74.5 per cent of the 1925 to 1927 average. Two weeks ago a figure of 73.5 obtained, whereas in the comparable period last year the index stood 17 points lower at

57.5. Heavier volume of raw steel production and industrial gains at Pittsburgh in excess of the pre-flood level were chiefly responsible for the index's current showing. Automobile production also increased, but the heavy construction and lumber shipment indices declined. The drop in the construction index was particularly severe.

Components of The Index: (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.



... *Anti-basing point bill criticized bitterly by House member.*

o o o

... *Quantity discounts arouse sharp differences of opinion in Washington.*

o o o

... *Business is fittingly characterized as "whipping boy of politics."*

o o o

... *Labor Board wins its spurs as prime heckler of steel industry.*

o o o

BY L. W. MOFFETT
Resident Washington Editor,
The Iron Age

o o o

WASHINGTON, April 14.—The steel and other industries which are opposing the Wheeler-Utterback anti-basing point bill have been given forceful argument in support of their position by Representative Emanuel Celler of New York, ranking Democratic member of the House Committee on Judiciary. . . . Mr. Celler took a sharp swing at the principle of that bill in a searching minority report on the so-called Patman-Robinson anti-chain store bill which, as recently reported from the House Judiciary Committee, carries an anti-basing point provision. . . . The latter measure would require that all quotations must be f.o.b. manufacturing plants or mines. . . .

"I believe," said Mr. Celler, "that the method of pricing this bill would prescribe would have most serious and deleterious effects upon industry." . . . The restriction, he declared, will localize all industry and manufacturing. . . . To prove

his contention he cited an example of A and B, shoe manufacturers, at New York and St. Louis, and he could have substituted the term "steel manufacturers" with equal or even greater applicability to the issue. . . . He showed how A in order to get into St. Louis has to absorb freight charges from New York to St. Louis in order to sell X in St. Louis. . . . The manufacturing costs of A, Mr. Celler pointed out, are partly the result of A's enjoying the business of X with profit. . . . But if A is compelled to superimpose upon his price the transportation cost, he will lose the account of X and B will get the business and A's costs will be increased. . . . "A ordinarily made up the transportation charges of shipping X by means of mass production and other economies," said Mr. Celler. "He will be restricted in doing so under this bill. The effect therefore will be the following: A will be compelled to confine his activities to New York, and B * * * will be compelled to confine his activities to St. Louis. Thousands of businesses will thus become parochial, because the circle of customers will be more and more definitely limited. The result will be increases in manufacturing and distributing costs and a cutting off from customers of the full benefits of mass production

and distribution. The consumer again will 'pay the piper'." . . .

This contention is vital because of both its soundness and its source, which certainly can't be accused of being partisan. . . . It is also important because the Wheeler-Utterback bill is before the House Committee on Judiciary as well as the Senate Committee on Interstate Commerce, and the attitude of Mr. Celler on the anti-basing provision in the Patman-Robinson bill clearly reflects what it is toward the Wheeler-Utterback measure. . . . It is also understood that other members of the House committee, probably a majority, have a like attitude. . . . This would indicate that, even if the bill emerged from the Senate committee, it would have hard going before the House committee. . . . However, doubt grows that it will be reported out from the Senate committee at the present session, if at all. . . .

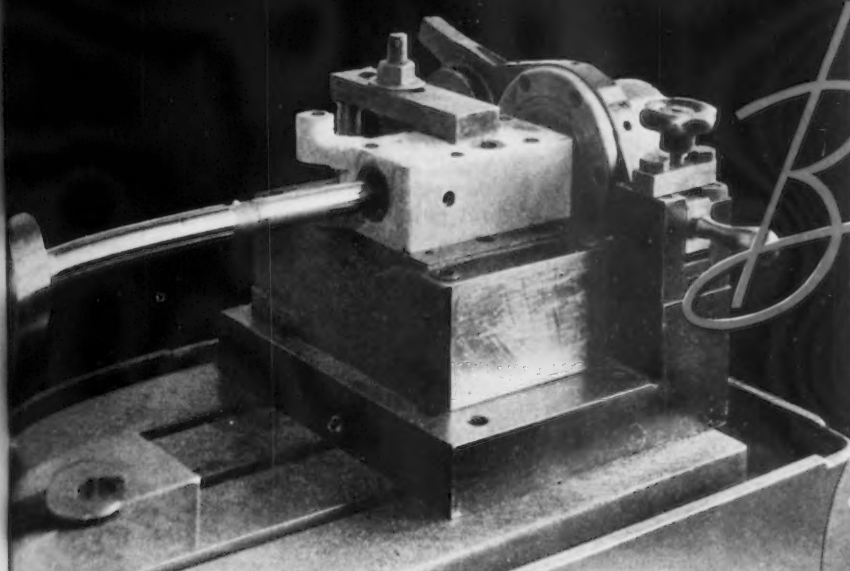
Mr. Celler also attacked the anti-basing point provision in the Patman-Robinson bill because the Wheeler-Utterback bill is being studied by the Senate committee. . . . He said that to interject such far-reaching legislation into the Patman-Robinson bill, "which has had the benefit of no hearings on the subject whatsoever, since this is an entirely new provision, is most ill-advised and dangerous."

The New York Democratic representative strongly attacked the Patman-Robinson bill throughout, carefully and pungently analyzing each of the many provisions which he finds objectionable. . . . While the measure is supposed to strike only at so-called price discrimination against independent retailers, it actually affects all manufacturing, wholesaling, jobbing and retailing lines. . . . Instead of strengthening the anti-trust laws, Mr. Celler said it would weaken them and build up monopoly, increase prices, reduce consumption, increase unemployment and finally do harm "to those who most ardent-

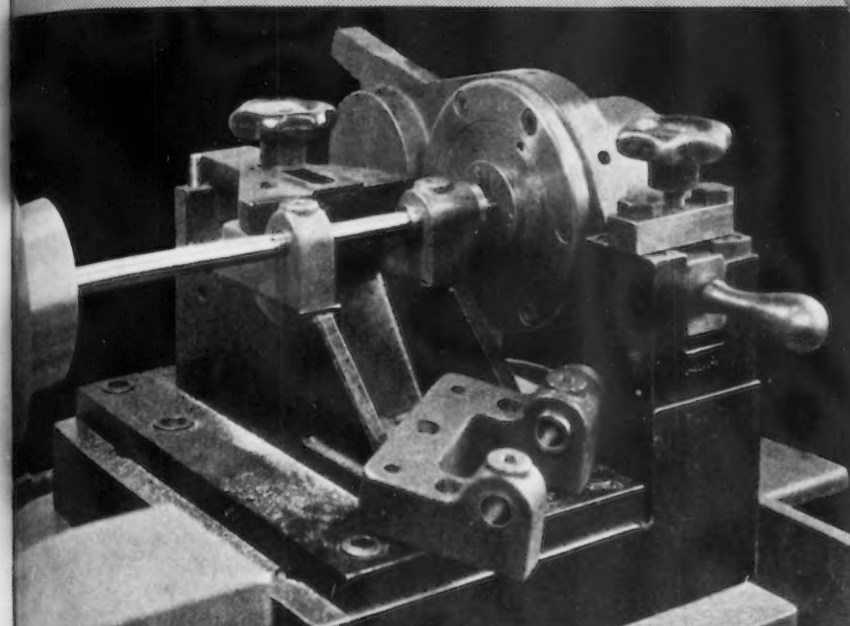
Bore-Matic

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TIME-SAVING

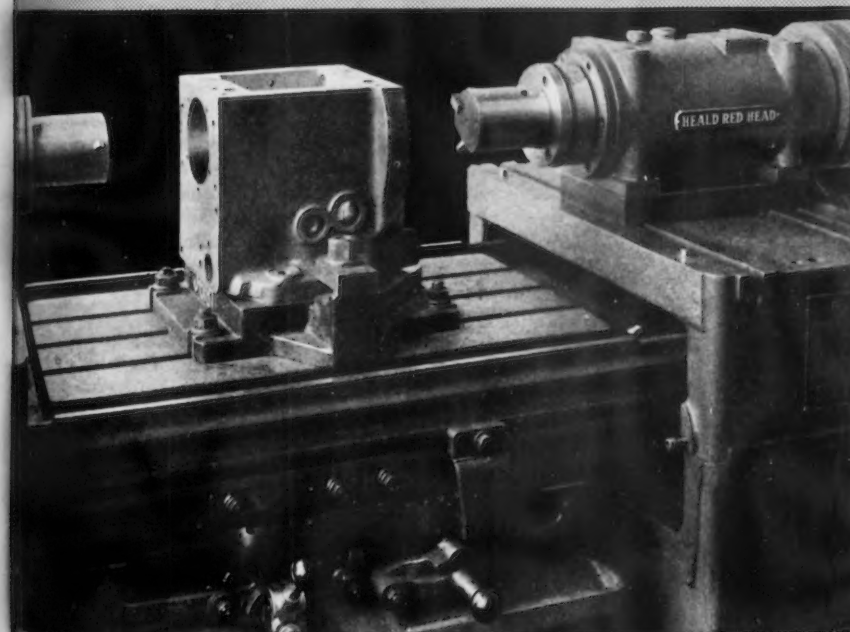
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22 DIFFERENT PARTS



Cast Iron Valve Body with hole $1\frac{1}{4}$ " diameter and 7" long.
Previous time 22.4 minutes. Bore-Matic
time 5 minutes.



Cast Iron Bracket where holes must have perfect alignment.
Previous time 18.3 minutes. Bore-Matic
time 2.7.



Cast Iron Workhead Body in which ball bearing
seats were bored and shoulder faced. Previous time
was 78.5 minutes. Bore-Matic time 8.5.

MEETING the accuracy and quality required in today's products must necessarily demand the latest methods of manufacturing. Not only do Heald Bore-Matics meet the closest tolerances in size, alignment and required position of bore with other points, but a careful check at one machine tool manufacturer's plant where the lots run from 25 to 50 pieces, shows the Bore-Matic produced a saving of from 3 to 79 minutes per piece over previous methods.

The work consisted mainly of cast iron and bronze gears, pulleys, bushings, bodies, brackets, cylinders and like work, and the operations were boring and facing. The tolerances for roundness and straightness ranged from .0001" to .0002" and for size .0002" to .0005".

THE HEALD MACHINE COMPANY
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ly believe it will increase their profits." . . . It seeks to limit "quantity discounts," which could be fixed by the Federal Trade Commission, the proposed administrative body. . . . Mr. Celler pointed out the economic soundness of quantity discounts by reason of lower costs of production and quoted the recent decision of the Supreme Court in the Sugar Institute case which upheld the practice. . . . "Thus, we have this anomalous situation," said Mr. Celler. "The proponents of this bill frown on 'quantity discounts.' . . . The Supreme Court approves of 'quantity discounts.'" . . . In another line of attack, Mr. Celler said the Federal Trade Commission would be converted into a huge bureaucracy and showing the immense number of articles in commerce he in effect stated that it would be physically impossible for the commission, even with a necessarily much enlarged staff, to administer the act. . . .

Mr. Celler understated the case. . . . The Federal Trade Commission already is a petty, business-baiting bureaucracy. . . . Like other Government bureaus and boards, it stirs up cases with the greatest of ease and grinds out complaints, investigations and reports, with bewildering rapidity. . . . And like other Government activities, it is suspected, it does so as a means of justifying its existence, fastening itself to the treasury at ever-mounting costs to heavily loaded taxpayers. . . . Their burden is bound to increase rather than decrease, due in substantial degree to the maintenance of the tremendous horde of Federal employees, many of whom are only idlers or are engaged in activities designed further to heckle business and industry. . . . Many loose gestures are made toward the elimination of some of the worse than useless alphabetical soup agencies and of "coordination" of others as well as of old bureaus. . . . But these gestures are only gestures and are no longer taken seriously. . . . Certainly they will not be so taken until after the political campaign, if then. . . . There are too many votes and contributions involved.

And as to quantity discounts being approved by the Supreme Court, that is of no consequence in Washington these days. . . . If the much assailed "oligarchy" upsets the plans of some small-minded self-sufficient dictator engaged in frenzied outpouring of millions upon millions to selected groups, a subterfuge is resorted to and the spending spree is continued unabated. . . . But even the farmers are being slowly disillusioned. . . .

They are finding that it is the big fellow who does not need it who is getting the chief benefit of the pap which has to be forked over either directly or indirectly by the public at large. . . . And depriving consumers of the right of quantity discounts means the same thing. . . . Yet the elimination, or at least a sharp restriction of quantity discounts, a price raising device, is the purpose of some legislators and bureaucrats who shout most loudly that industrial prices must be brought down and who affect great solicitude for the consumer.

The Federal Trade Commission recently issued a cease and desist order against the Goodyear Tire & Rubber Co., prohibiting so-called price discrimination in the sale of tires to Sears, Roebuck & Co., while, on the other hand, it rails about high industrial prices as it pretends to bat valiantly for the consumer. . . . Fortunately the Goodyear company has taken the case to court, and, in view of the Supreme Court's approval of quantity discounts, it will be particularly interesting to see what happens to the order. . . . Quantity discounts on certain flat-rolled steel products were the subject of mildly critical inquiry by Senator Wheeler at the hearing on the anti-basing point bill but it was observed that the Senator did not press the issue.

Even NRA Didn't Control Prices

Those who manifest so much concern over fixed industrial prices may find their apprehension relieved if they will direct their attention to an NRA price study made available last week by the Department of Commerce. . . . This exhaustive survey of price regulation shows that, even under the broad leeway given by the Blue Eagle, price regulation proved a flop. . . . Though it was held that seven unnamed industries ran afoul the anti-trust laws by reason of attempted price fixing, the efforts to fix prices collapsed. . . . This would confirm the view of many economists who insist that maintenance of fixed prices on a wide scale over a protracted period is not possible. . . . The report takes a vigorous rap at attempts to fix prices under NRA and is in this direction an incisive condemnation of the Blue Eagle and its works. . . . Others of many additional NRA studies are equally caustic in their comments on this futile, confused and hectic attempt at Governmental regimentation of industry, an attempt that broke down before the NRA was knocked out by the Supreme Court as being

unconstitutional. . . . In the face of its breakdown and despite the highly unfavorable reports, however, it is said that lively efforts are quietly being made to stir up support for resurrection of the old buzzard by legislation at the next session of Congress, provided the New Deal is continued in power. . . . Just how anything other than an anemic Blue Eagle could be restored to the perch in view of the Supreme Court decision is not possible to conceive. . . . Perhaps the customary resort to subterfuge to circumvent the Supreme Court will be attempted. . . .

In the report on price regulation some strong English was used. . . . For instance: "In seven of the industries studied, such efforts (by industry members to exercise a greater degree of control over their price structure) brought them into conflict with the anti-trust laws. In one of these seven, and in three additional cases, racketeering was resorted to in a desperate effort to remedy conditions." . . . Direct minimum price fixing was declared to have been the most unsatisfactory from an administrative point of view. . . . A crack was taken at the grant of power to code authorities which was said to have been too broad in most cases to permit NRA to exercise an adequate degree of supervision. . . . After naming a number of efforts at price control, the report said: "In some cases these efforts to ameliorate conditions by limiting price competition resulted in complete failure." . . . Then it turned to a situation which reflects a common experience in industry. . . . "In many cases price control was sought by one group in an industry primarily in an attempt to circumscribe the activities of the competing group," it was pointed out. . . . "These efforts failed almost uniformly, either because the faction at which they were directed refused to cooperate or because NRA refused its backing." . . .

Plans for a Revised NRA

Meanwhile, however, moves are still being made to set up a revised edition of the NRA by means of the so-called Healey (formerly Walsh) Government Contracts Bill, which has Administration sponsorship, though it is doubted it will get anywhere at the present session, if at all. . . . Bitterly assailed by industry, the bill has been sharply modified by a House subcommittee and is much less drastic than it was in its original form. . . . However, it still is a bill designed to coerce industry to adopt many of the old NRA code standards. . . . One amendment proposes a boycott.

... It would put on the blacklist for three years, during which they could not bid on Government business, bidders who did not comply with the fixed standards. ... It would set up still another Government regulatory body to be added to the endless number of Federal bureaucratic organizations by creating a three-man board to administer the act. ... This provision was taken to be a rebuff for Madame Secretary of Labor Perkins who in the original measure would have administered the act. ... Standards as to hours, wages, etc., for all industries bidding for Government business would be set forth in all contracts. ... As a penalty for paying less than the prescribed level, contractors would be compelled to pay twice the difference between wages actually paid and those specified in the contract. ...

Business As a "Whipping Boy"

Harper Sibley, president of the Chamber of Commerce of the United States, didn't miss it when he said in a radio address last week that business has been seized upon as the "handy whipping boy of politics." ... As though they reflect a deliberately organized movement, almost daily attacks on so-called big business emanate from Washington sources, including both the legislative and executive branches. ... Some of the outbursts take on the aspect of fanatical fury. ... The iron and steel industry is a favorite, though not an exclusive, target. ... Shafts are being directed at "large enterprises" generally. ... If the design is to widen the breach between business and the Government, the moves seem well aimed to accomplish that purpose. ... Just what they may do in the way of a political play to labor and agriculture and to intensify group consciousness is an open question. ...

Labor Board Has Its Innings

Climaxing a series of attacks on steel are those which have belched forth from the National Labor Relations Board and the LaFollette Senate Labor Subcommittee which is investigating so-called labor spy systems. ... In a highly dramatized order issued last Friday, the NLRB charged the Jones & Laughlin Steel Corp. with "terrorizing employees" and demanded that the company reinstate 10 employees, who, the board said, were discharged for union activities, though the steel company told the board they had been dismissed for inefficiency. ... On the same day, Chairman J.

Warren Madden of the board appeared before the LaFollette subcommittee and presented a barrage against espionage in industries which sounded like a movie thriller. ... At the same time two steel employees testified before the subcommittee and alleged widespread espionage against organized labor workers existed in plants where they have been employed. ... The NLRB order against Jones & Laughlin, which will be contested in the courts and will mark a test of the constitutionality of the Wagner-Connelly Labor Disputes Act, followed immediately upon the taking of "expert testimony" about labor relations in the steel industry which revolved around complaints against Jones & Laughlin, the Wheeling Steel Corp., and the Crucible Steel Co. of America. ... The order, like all orders so promiscuously issued by the NLRB, described fully the operations of the Jones & Laughlin company to show that its business is interstate in character. ... The purpose, of course, was to lay a court case in an effort to uphold the labor act. ... When he appeared before the LaFollette subcommittee Mr. Madden said that "large enterprises furnish spies to industry" and that espionage threatens collective bargaining. ...

The Senate already has passed and the House Committee on Judiciary last Friday made a favorable report on a bill to curb so-called professional strike-breaking organizations, a measure strongly

backed by organized labor. ... The bill is sponsored by Senator James F. Byrnes, Democrat, South Carolina, and would prohibit the transportation in interstate commerce of a person employed to interfere with peaceful picketing or collective bargaining. ... Some who favor the bill claim it would not be effective because so-called professional strike-breaking continues in eight states whose laws bar importation of strike-breakers. ...

But that isn't the chief point. ... The tirade against business, regardless of its merits, is based on the desire to pluck political plums, to hang onto the Federal payroll, to draw glorified doles from taxpayers. ... Mr. Sibley, answering his own question as to the reason for the prejudices and antagonisms aroused against business, stated the case concisely and accurately. ... "It is to give some political party a momentary advantage," he said, "to enable some office-seeker to gain publicity as the embattled 'friend of the people'; to enable some Government bureau to invent a new duty by which to perpetuate its existence and thus strengthen and enlarge its grip upon the public treasury." Mr. Sibley said that "the misrepresentations and pilorying of business must be stopped forthwith" by the courageous setting up of facts against false assertions intended to gain temporary political advantage. ... "Thoughtful effort to improve conditions and to safeguard the future against repetition of past difficulties is a

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THE IRON AGE, April 16, 1936—63

far cry from the frenzied witch-burning into which some politicians and office seekers are seeking to transform the process," said Mr. Sibley. . . .

The "blessings" of a bureaucracy are also getting the attention of Senator Borah of Idaho as he tours the country on his presidential campaign. . . . Between blasts at monopolies, the Senator takes barbed shots at the bureaucracy now centered in Washington. . . . "We are building a bureaucracy which is sucking the very life-blood of the nation in taxes," the Senator said with deadly accuracy. . . . "If we keep on the way we are going, every farmer will be carrying another on his shoulders as he plows his corn. . . . We have been increasing Federal jobs at the rate of 100,000 a year. Part of it we can't help, for we must feed the hungry. But when the departments let out in Washington it reminds me of the Bible story about the locusts pouring into Egypt." . . .

Representative P. L. Gassaway, Democrat, of Oklahoma, also gave voice to well-known truths worth repeating when he divided members of Congress into three classes, as follows: (1) The sincere man who wants to do something for his country and humanity; (2) the political accident who doesn't know how he got to Washington, why he is here, or when he is going home; (3) the fellow who knows that he

is being paid \$9,950 a year (members of Congress are paid \$10,000 a year) too much for being a member of Congress, but would vote for polygamy six months a year if he thought he could keep his job.

Unfortunately a large section of the present Congress falls into the second and third groups. . . .



Housing Act Changed By Amendments

Amendments to the National Housing Act, extending the modernization credit plan from April 1, 1936, to April 1, 1937, carry five important changes. The first change eliminates all new construction on unimproved real property from consideration and the exclusion of loans to tenants except those who are lessees.

The act specifically excludes from insurance loans or advances of credit in the amount of \$2,000 or less for the purchase and installation of equipment or machinery upon any type of improved real property. However, it permits the insurance of loans or advances of credit for the purpose of making additions to real property. Therefore, according to an FHA release, items of machinery and equipment which become additions to the real property will be considered eligible, whereas those which do not become additions to the real property (that

is, a part of the structure) will be considered as ineligible.

On loans from \$2,000 to \$50,000 on Class A property it is not a requirement that the machinery or equipment become an addition to the property. In cases of this sort the old eligibility rulings still apply as a whole, with a definite provision that the equipment must be installed. Portable equipment is ineligible.

Insurance against loss to lending agencies has been reduced from 20 to 10 per cent of the total amount of the loans made or credit advances. It was stated that 20 per cent was found to be a factor of safety far beyond what was necessary. Losses under the modernization credit plan which have been paid by the FHA, it was said, are less than 0.3 per cent of the total volume of loans insured.

Another change made was the reduction of the maximum liability which the FHA may incur for modernization credit insurance from \$200,000,000 to \$100,000,000.



Tin Plate Scrap Ban April 16-July 1

Through a typographical error THE IRON AGE last week said that exports of tin plate scrap will be prohibited from April 16 to July 16. The latter date should have read July 1.



Proposes Suspension of Assessment Work on Mining Claims

A bill has been introduced into Congress by Representative Ayers of Montana, providing for the suspension of annual assessment work on mining claims for the year ending July 1, 1936. It provides exemption from the annual requirements on not to exceed six lode mining claims held by the same individual, nor twelve such claims held by the same partnership, association or corporation; similar provisions apply to placer-mining claims.

An identical bill, introduced by Senator Hatch of New Mexico, has already been passed by the Senate.

The House bill is now on the calendar, with no indication as to when it will come up for a vote, but it is generally regarded as in a favorable position for enactment at this session.



Eastman Looks Ahead in Railroad Field

Speaking Monday night before the Engineers' Club of the Lehigh Valley at the Packhard Laboratory

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of Lehigh University, Bethlehem, Pa., Joseph B. Eastman, Federal coordinator of transportation, gave a picture in broad strokes of some of the things which he predicts are coming in the way of railroad development. He visualized a central scientific, engineering and economic research department acting for all railroads, able to establish within proper limits standards for equipment, construction, materials and supplies, not too rigid or difficult to change, but which will prevent the great and unnecessary diversity of types which now adds heavily to costs. This department would also, as similar departments in other great industries have been able to do, keep the railroads not only abreast but ahead of the times, produce inventions, as it were, to order, and furnish the means of testing new and promising developments at common expense."

Mr. Eastman pictured many of the freight cars of the railroads, which move in free interchange all over the country, handled in a common pool so that they can be utilized with much less waste motion, just as the Pullman cars and to some extent the refrigerator cars are at the present time, and so that purchases of new equipment may be financed to maximum advantage and made in the orderly manner and at the appropriate times which will reduce manufacturing costs. He said also that he saw, among other things enumerated as looking to improved economics and service in transportation, the joint use of some shops, where conditions favor it, and a gradual raising of shop equipment and methods up to the high standards which now prevail on some of the railroads, and similar progress in the handling of materials and supplies and the disposition of scrap and waste material.

In passenger service of greater frequency and flexibility, Mr. Eastman envisaged single-unit cars propelled at low cost by gas or Diesel power with some form of mechanical or hydraulic or electric transmission, adapted to multiple-unit operation. To achieve light weight, he said, new metals and methods of construction will be used.

In freight service, Mr. Eastman said he could see the less-than-carload, express, and car-forwarded traffic combined, concentrated, and handled in much more heavily loaded cars of shock-proof construction, moved at passenger-train speeds. The distribution at either end, it was stated, will be done by trucks, probably to and from railheads usually located outside of the crowded city areas. An intermediate service, between the present less-than-carload and carload ser-

vice, will be developed by the use of containers carried on flat cars. They will be of lightweight construction, of uniform types, and capable of interchange between all railroads and between railroads and motor trucks or water carriers, the coordinator said. He also predicted a gradual revision of the freight rate structure looking toward simplification of rates and a closer relation to cost of service. The general tendency of rates, it was stated, will be downward.

At present, Mr. Eastman said, railroad employees fear and oppose any changes which will have the immediate effect of displacing labor. The managements and the men, he said, have been negotiating in regard to this matter and the hope was expressed that they may be brought into agreement, or that the necessary protection of employees can be provided through reasonable and practicable legislation.

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Steel Industry Study by Former NRA Committee to Be Completed Later

WASHINGTON, April 14.—Declaring that there is normally a considerable degree of stability in the prices of iron and steel products, the NRA "evidence study" of the industry says that the prices set by such large companies as the United States Steel and Bethlehem tend to establish a level to which other companies more or less conform.

The study is one section of an exhaustive study of the iron and steel industry undertaken by the Division of Review of NRA and in turn is one of a wide range of studies of industries throughout the country. These studies are being analyzed by a Committee on Industrial Analysis set up by Secretary of Commerce Daniel C. Roper. The department took over the skeletonized NRA shortly after the Supreme Court decision which held that the National Industry Recovery Act as it originally existed was unconstitutional. The Division of Review was headed by Dr. Leon C. Marshall, who is chairman of the recently created Committee on Industrial Analysis. The steel study was originally undertaken by former Deputy Administrator R. W. Shannon. Upon his resignation he was succeeded by A. G. White who continued the work. However, because of its vast character, Mr. White was unable to complete the steel study when NRA went out of existence on April 1. Plans are being made to have the study completed by a staff from the Bureau of Foreign and Domestic Commerce, if funds can be provided for this purpose.

The evidence studies were originally planned as a means of gathering evidence bearing upon various legal issues which arose under the National Industrial Recovery Act. They are now to be included in code histories. It may also be added that there is a growing conviction that the studies, which Secretary Roper has said, are to be used for preserving "assets of NRA," will be used to support attempts to revive NRA in some form by new legislation if the New Deal is continued in power.

In the "evidence study" of the iron and steel industry, Mr. White gives a comprehensive review of the industry, its capacity, relationships of output among its various units, trade practices, labor relations, etc., together with its history

before, during and after codification.

In discussing prices in a section on operation of price filing under the main topic of trade practices, Mr. White says that prices are more stable for heavy standard products such as rails than for special products used by the automobile industry. Prior to the code, he states, there was apparently an abnormal variation between quoted price and actual prices. He quoted Walter S. Tower, who was secretary of the code authority, as stating that under code provisions unfair trade practices which prevailed prior to the code had largely ceased to exist. The unfair practices, the report says primarily relate to the discrepancy between published prices prior to the code and actual selling prices.

Prices for Government purchases are said to have shown a much greater relative decrease than general price quotations. The bargaining power of large-scale buyers, such as automobile manufacturers, was strengthened, it is pointed out.

"Restoration of price stability was obviously an important industry objective in writing the code," the reports says. "This program involved provisions relating to filing of prices such as extras, deductions, discounts, basing points, transportation charges, a ten-day waiting period for price changes, length of contract and determination of jobbers' discounts."

An examination of the records of prices filed indicates the tendency of the open price filing system toward a uniformity of quotations by competitors, although this is not always the case, Mr. White states.

"The same tendency has been noted in the bids submitted to public purchasers," it is pointed out. "Some critics claim this indicates collusion in price-fixing. On the other side, it is pointed out that price publicity tends to reduce prices to a common competitive level of fair competition and that filed prices, open to public inspection, serve as a protection to buyers of steel products against secret rebates to their competitors."

In discussing the establishment of basing points, Mr. White says that the established policy of the code Administration was to increase the number of such points

for filing prices with the view of establishing a closer relation of such points to producing centers. In the amended code, he says, there are some 38 different commodity groups for which about 258 basing points are named, including, of course, many duplications where the same city is specified for several products. Increases under the amended code showed seven cases of either new or enlarged commodity groupings and the addition of 29 new specified points. Practically all complaints, it is stated, have related to the need for the establishment of new basing points. The major part of these cases, it is stated, have been adjusted either in the original or amended code.

The problem of fabrication-in-transit rates is declared to be primarily a result of existing railroad rate practices. It is practically a stop-over privilege by which semi-finished material such as plates, shapes and bars can stop in transit and be fabricated at the purchasers' plant and then be re-shipped to final destination, for use in an identified structure, on an original through rate from producers' mill to point of final delivery, with only minor extra charges, the report says.

Discussing history of the industry, the report says that recently iron and steel production shows a further shift to automobile manufacturing centers. Relative consumption by railroads has declined while automotive, structural and canning uses have grown, it is stated. Progress in the use of special alloy steels is notable, says the report.

"Consolidation and integration of steel company operations has continued," it is pointed out. "The position of the United States Steel Corp. has relatively declined with the growth of a number of strong independents. With the growth of integration, numerous small obsolete and isolated blast furnaces have been dismantled."

Referring to organizations in the industry, the report says its policy has been definitely in favor of the open shop and that labor organizations of national scope are of relatively small importance. The Amalgamated Association of Iron, Steel and Tin Workers, it is stated, is the principal union with an active membership of about 6000, as shown at the last convention of the American Federation of Labor, or only about 1.5 per cent of the total number of workers in the industry. A table on labor statistics shows that average hourly wage rates rose from 52.1c. in 1932, a pre-code year, to 63.2c. during 1934, the first full year of codification.

Change in Spring Steel Price Set-Up

AS of April 1, cold-rolled, high carbon spring steel, with a carbon content in excess of 0.25, will be sold on a new price basis. The extras for high carbon content heretofore included in the standard list of cold-rolled strip steel extras, will be eliminated from that list, which will apply only to material with a carbon content of 0.25 or less.

Base prices for cold-rolled high carbon spring steel were published in THE IRON AGE, April 9, 1936, page 93. A new list of extras, effective April 1, applying only to cold-rolled spring steel, has been compiled and published which, it is understood, will be adopted by all producers.

Although this change in computing prices constitutes no change in the resulting net prices, new schedules simplify the method of computing them.

Metal Trades Group Announces Program

THE National Metal Trades Association has made public the complete program for its annual convention, to be held at the Waldorf-Astoria, New York, April 22 and 23. At the annual dinner, at 7 p.m., April 22, Merle Thorpe, editor, *Nation's Business*, will speak on "The State of the Union."

The program follows:

WEDNESDAY, APRIL 22

9:45 a. m.—Assembly.

10:00 a. m.—Call to order.

Invocation—Rev. Finis Idleman, Central Church of Disciples.

Song—"America."

Report of President—Alexander Sellers.

10:30 a. m.—Employer-Employee Cooperation.

"The Problem"—H. W. Johnson, chairman of Committee, De Laval Steam Turbine Co., Trenton, N. J.

"Management's Responsibility"—J. S. Knowlson, Stewart-Warner Corp., Chicago.

"Need for Coordinated Effort"—Howard Dunbar, Norton Co., Worcester, Mass.

"The Direct and Indirect Benefits from the Program"—Louis Ruthenberg, Servel, Inc., Evansville, Ind.

11:45 a. m.—Discussion.

12:30 p. m.—Complimentary Luncheon.

2:00 p. m.—"What the Machine Has Done to Mankind"—Dr. James S. Thomas, president, Clarkson College of Technology.

2:30 p. m.—"Oh, You Rascal, You"—J. H. Van Deventer, editor, THE IRON AGE.

3:15 p. m.—"Legal Aspects of Recent Legislation Regulating Business"—F. H. Wood, attorney, Cravath, de Gersdorff, Swaine and Wood, New York.

3:45 p. m.—"The Federal Old Age Security Program and Some of Its Consequences"—M. Albert Linton, president, Provident Mutual Life Insurance Co., Philadelphia.

THURSDAY, APRIL 23

9:30 a. m.—Call to order.

"The Need for Skilled Help and How

to Meet It"—George A. Seyler, works manager, Lunkenheimer Co., Cincinnati.

10:15 a. m.—"Current Legislation and Litigation Affecting Employers"—John Gall, associate counsel, National Association of Manufacturers.

11:00 a. m.—"Present Federal Tax Problem"—Henry B. Fernald, Loomis, Suffern and Fernald, accountants, New York.

11:30 a. m.—Reports of Committees. Election of Officers. Adjournment.



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Steel Corporation Research Director Debunks Foolish Testing Methods

A GREAT deal of foolish testing and foolish analyzing is being done every day by manufacturers of semi-finished materials, by fabricators and even by customers, in the opinion of Dr. John Johnston, director of research, United States Steel Corp. Dr. Johnston spoke before the Detroit district spring meeting of the American Society for Testing Materials, April 7. The speaker wondered if most people are actually testing what they are testing for. To do a proper job requires impartial investigation over a long period and careful analysis of each test, besides the careful selection of proper samples.

As an example, Dr. Johnston showed how difficult it was to test the value of an addition to liquid steel, such as a deoxidizing agent or some alloy intended to improve the physical properties. Because such additions may seem to improve a single heat does not necessarily prove the case in hand. In

the first place, it is not always possible to make identical steels in two different heats and it is impossible to judge the quality until the steel has been put through a whole series of finishing operations. It requires the examination of several samples of the new analysis compared with steel not having the added element. Yet to give a fair test, each steel should be treated in its own best way, which requires further research and careful systematic tests to settle the matter. There are so many variables involved in the manufacture of steel that it is difficult to have exact scientific control so that the two samples, for example, are comparable in all respects with the exception of one variable under consideration.

Cooling Practice Analyzed

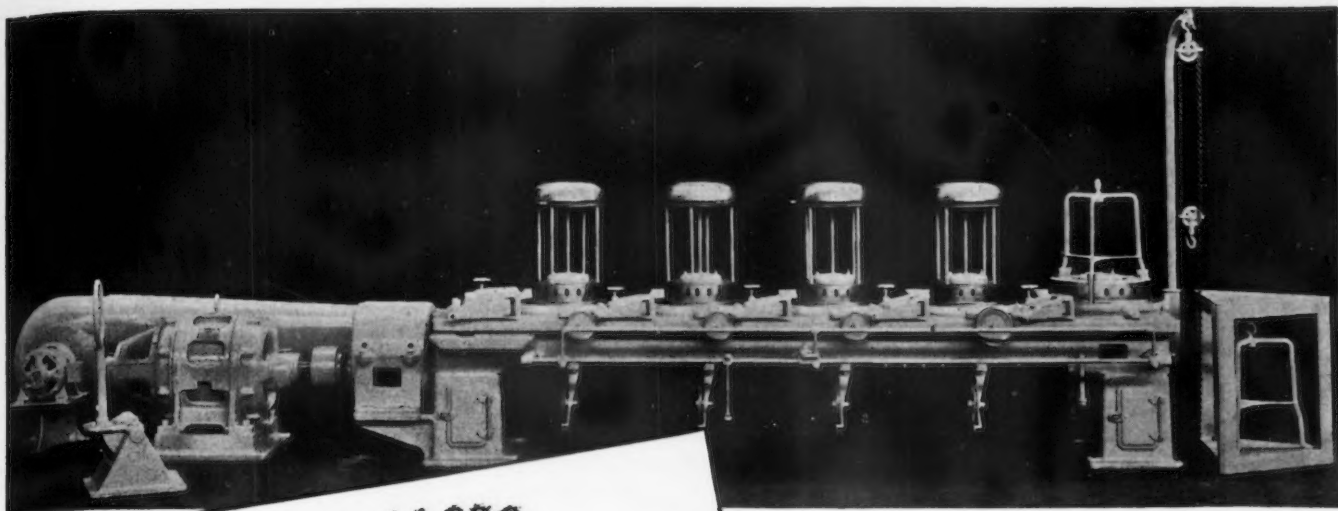
As another example, Dr. Johnston showed how the mode and rate of cooling affects physical properties of steel, indicating that the

rate of cooling prior to the transformation point is the only factor that counts. This led him to discuss the matter of grain size. He believes it illogical to test grain size by a single method. Grain size should be tested under the same conditions as the steel will be used in practice. Further work is needed on why steel coarsens and the relation of grain size to the transformation point. Transformation is faster with small grains because such action starts at the grain boundaries and sweeps across. Alumina is one of the more common nuclei for the start of the transformation, but little is known about the determination of alumina in steel, since fine particles have a much greater rate of solution in the common acids used in making quantitative analyses. Dr. Johnston believes that the present methods of determination of alumina and aluminum to be worthless. He maintains that two analysts cannot even agree within 25 per cent on the determination of sulphur in an identical sample.

Testing for physical properties should be done cautiously. The range of values on thermal expansion may vary as much as two to one on the same steel, according to

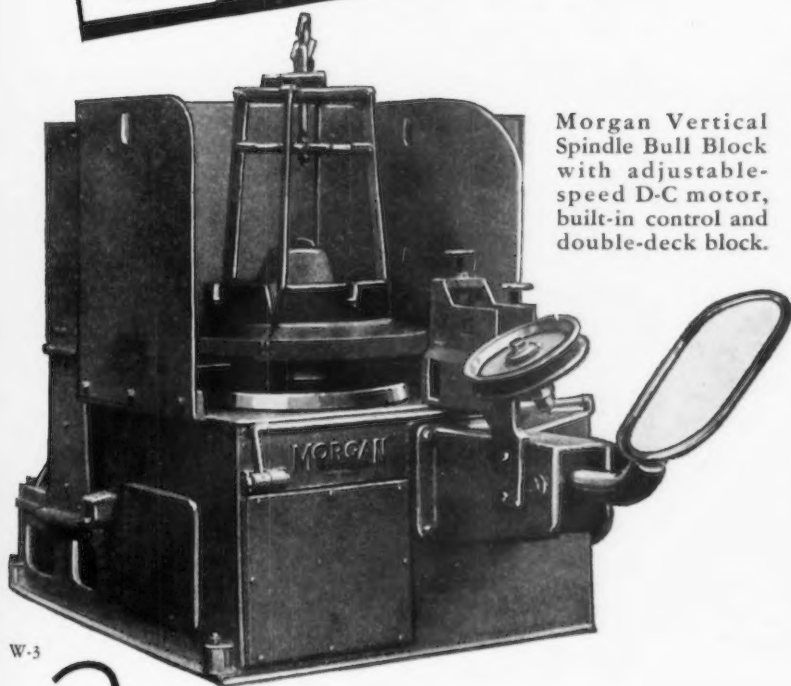
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Morgan-Connor Continuous Wire Machine, Type B. Fully equipped with motor and control, air-cooling system, clutches and safety stop.

Minimum
MAINTENANCE
for
MANY MILES—



Morgan Vertical Spindle Bull Block with adjustable-speed D-C motor, built-in control and double-deck block.

● Compact strength is manifest in every part of Morgan-Connor Wire Machines—excess bulk is eliminated—floor space is saved. High sustained F.P.M.—uniform quality output and low maintenance costs are typical.

The Morgan-Connor Continuous Wire Machine's high block design allows proper cooling between dies permitting greater tonnage per unit when drawing high carbon wire. By an improved clutch arrangement butt welding of stock is wholly practicable, thus making it possible to operate continuously for the life of the dies.

The Vertical Spindle Bull Block illustrated on the left is another Morgan self-contained unit. Flexible, rugged, convenient, with adjustable speed D-C motor, this machine may be used with either single- or double-deck blocks in diameters to suit the customer's needs. This wire block is built in various capacities to draw all sizes to 1" round.

There is a Morgan Wire Machine to meet your wire making requirements—increase output and reduce costs.

**MORGAN CONSTRUCTION
COMPANY**

Worcester, Massachusetts, U. S. A.

W-3
MORGAN
Wire Machines



its previous history. Dr. Johnston showed charts illustrating how cold working affected the expansion of 18-8 austenitic steel. Present data are by no means as accurate as we would like to have them.

What to Do With "Creep"

Other tests that Dr. Johnston considered rather useless at the present time are the test for creep, because change in structure may often be misinterpreted as creep. "What do engineers do with creep when they get it?" was the question asked by Dr. Johnston. He snorted at the idea of magnetic permeability tests of annealed steel when the sample is used in practice in the cold-rolled condition. Corrosion tests he considered meaningless, but not useless to those who promote them. He believed, for example, that the rate of disintegration of stainless steel in boiling nitric acid was meaningless as a measure of its corrosion resistance when exposed to the atmosphere. Any accelerated tests are very likely to be misleading. He put little confidence in salt spray tests unless the metal is to be used in salt spray. There is a difference, for example, between sea water and artificial salt water, which is usually acid due to the presence of CO₂. All accelerated tests are very likely to be misleading because by their very nature they tend to exaggerate natural conditions.

Dr. Johnston placed emphasis on

the selection of truly representative samples. He proposed a statistical method whereby sufficient samples are tested to give a proper picture. Such scientific procedures test the test methods themselves as well as the samples. He also pointed out the fallacy of judging by averages. Conclusions drawn from averages are only correct when the range and distribution of the data are approximately the same. In any event, the user does not want average material, but rather a material above certain minimum standards. Dr. Johnston proposed the use of frequency curves in such statistical analysis of test data.

Speaking of material standards, Dr. Johnston said that a decision by a majority vote of a committee is not necessarily the correct scientific decision, but rather represents a compromise between conflicting commercial interests. Such a standard should be arrived at strictly as a matter of scientific evidence.

United Engineering To Vote Bonus Plan

AT a meeting of the stockholders of the United Engineering & Foundry Co., Pittsburgh, to be held on April 28, a resolution embodying a bonus plan will be submitted for approval.

Features of the plan are that if

at the end of any calendar year the company shows a net profit after adequate provisions for depreciation, taxes, sales adjustments, etc., in excess of the 7 per cent dividend payable on the preferred stock and \$1.50 on the common, then an amount not exceeding 7 per cent of the total net profit may be set aside by the board of directors as a fund distributable under the direction of the board and at their discretion as additional compensation to officers, heads of departments and other employees of the company.

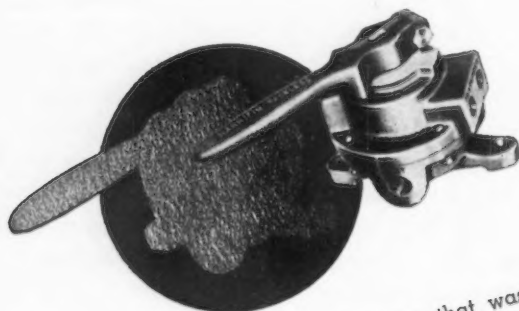
The manner, time, method and conditions regulating such distribution and the officers and employees qualified to participate are to be determined by a majority of a committee composed of members of the board of directors who are not officers nor employees of the company.

New "Metal Statistics" Is Now Available

THE American Metal Market, 111 John Street, New York, has issued the twenty-ninth annual edition of "Metal Statistics." Besides a collection of useful and informative data on economic subjects, this coat-pocket-size book furnishes in compact form a record of production, consumption, imports, exports, stocks, price fluctuations and averages (monthly and annually), data on various brands, analyses, trade terms, custom duties, etc., applying to finished and semi-finished ferrous and non-ferrous metal products as well as raw materials.

The 1936 edition has been further enlarged by the addition of monthly average price tables on six classifications of scrap iron and steel, as well as numerous additions and enlargements in the tin, lead, silver and gold sections of the book. In the copper department will be found five new pages of statistics on production, consumption and stocks in 1935 compiled from official monthly reports of Copper Institute, Inc.

Republic Steel Corp. has asked for proposals for the possible dismantling of the two Josephine furnaces at Josephine, Pa., formerly owned by the Corrigan, McKinney Steel Co. Proposals are to be submitted by April 20. One of the Josephine furnaces was built in 1906 and the other a little later. One has been idle since 1924 and the other since 1926. The furnaces have an annual capacity of 240,000 tons.



STOP the leakage that wastes air and runs up costs. Provide positive control for your air operated equipment with Hannifin "Packless" Air Control Valves. Their simple disc type construction stops valve maintenance and operating troubles. Made in 3-way and 4-way types, hand and foot models, manifold, electric operated, and special valves for controlling all kinds of air and hydraulic equipment. Write for Valve Bulletin No. 34-A.

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ENGINEERS • DESIGNERS
MANUFACTURERS
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HANNIFIN "Packless" AIR CONTROL VALVES

Green Diamond Is Newest Modern Train

THE Green Diamond is the newest of the modern, streamlined Diesel-electric trains, which was built for the Illinois Central System in the shops of the Pullman-Standard Car Mfg. Co. The five-car articulated train, which is General Electric equipped, was delivered to the railroad in March and, following an exhibition tour in the Mississippi Valley, the Southwest and the Great Lakes region, it will go into regular daily round-trip service between Chicago and St. Louis in May.

The new train is 330 ft. long, weighs 230 tons, is mounted on roller bearings, and is completely air-conditioned. Of steel and aluminum, it has only half the weight of a standard train accommodating 120 passengers. It will require less than 5 hr. for the 300-mile trip between Chicago and St. Louis; it will make a round-trip daily, and will supplant two steam trains now required for comparable service.

The train is made up of the

power car, the mail and baggage car, two chair cars, and the kitchen-lounge-observation car. In the power car are the main power-generating unit for driving the train; and an auxiliary oil engine and generator supplying current for lighting, battery-charging, air-conditioning units and kitchen appliances; and the air compressors, heating boiler, batteries and electric control apparatus, and water and fuel tanks.

Hartford Press Maker Resumes Deliveries

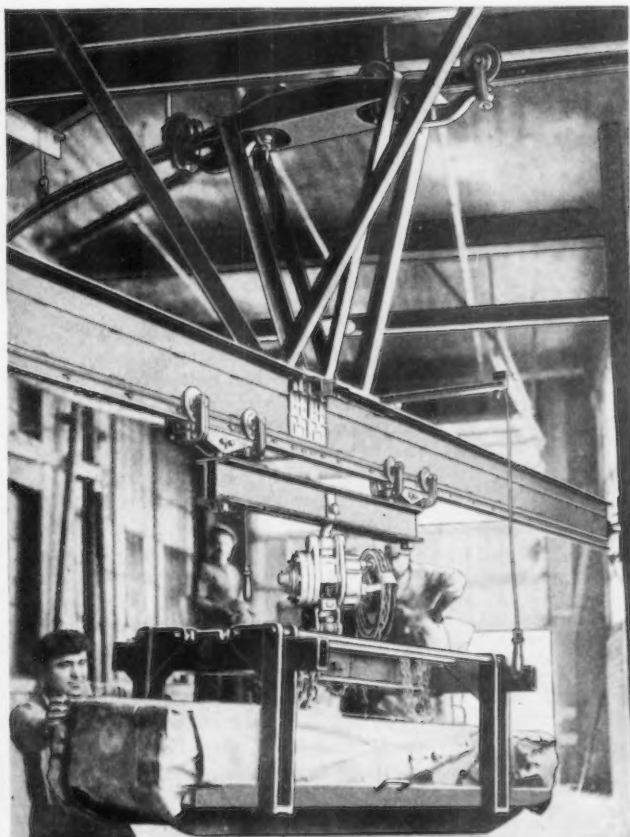
PRODUCTION of dieing machines and of its other products, interrupted by the recent floods, has been restored to normal by the Henry & Wright Mfg. Co., Hartford, Conn. Deliveries have also been resumed. The temporary offices, made necessary by the flood damage, have been given up with the removal into the rehabilitated previous quarters.

Engineering Education Group's Summer Plans

THE Society for the Promotion of Engineering Education has announced the program of a summer school for teachers of economics in engineering colleges which will be held at the engineering camp of the Stevens Institute of Technology, Johnsonburg, Warren County, N. J., during the last week of June. The committee in charge, which has as its chairman O. W. Eshbach of New York, consists of representatives of several colleges.

Dr. W. D. Ennis will be director of the curriculum for the summer school which will be in session at the Stevens engineering camp June 28 to July 5. Dr. Ennis is head of the Stevens Department of Economics of Engineering.

During this same week the sixth annual economic conference for engineers will be in session at the Stevens camp. The members of this separate conference, graduates of various colleges, will be permitted to attend the S.P.E.E. summer school sessions with their one-time tutors as fellow students.



CRANE unloads 21 tons in 30 minutes!

From truck to storage, over a simple MonoRail system, 21 tons of sheet steel are handled in 30 minutes. An every day job with a low cost swinging crane, manually operated, whereby handling labor is greatly reduced.

Our engineers will show you how such a system can be fitted to your plant requirements.

Write for new book on Mono-
Tractor drive for Cranes,
Hoists and Carrier units.

THE AMERICAN MONORAIL CO.

13103 Athens Ave., Cleveland, O.

THE IRON AGE, April 16, 1936—71

Steel Corporation March Shipments Establish Five-Year Record

FINISHED steel products shipped during March by the United States Steel Corp. totaled 783,552 tons, the highest figure recorded since April, 1931. Finished steel-making facilities were engaged at 50.5 per cent of capacity.

In the preceding month shipments were 676,315 tons, and operations averaged 45.3 per cent of capacity. During March, 1935, 668,056 tons was shipped, with facilities operating at 41.5 per cent of capacity.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORP.

Month	1933		1934		1935		1936	
	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity
January	285,137	17.7	331,777	19.8	534,055	31.9	721,414	*44.8
February	275,929	18.5	385,500	25.9	583,137	39.2	676,315	*45.3
March	256,793	15.3	588,209	35.2	668,056	41.5	783,552	50.5
April	335,321	21.6	643,009	41.5	591,728	36.7	.....	.....
May	455,302	27.1	745,063	44.5	598,915	35.8	.....	.....
June	603,937	37.4	985,337	61.2	578,108	36.7	.....	.....
July	701,322	45.1	369,938	23.9	547,794	34.0	.....	.....
August	668,155	39.8	378,023	22.6	624,497	37.3	.....	.....
September	575,161	35.6	370,306	23.9	614,933	39.7	.....	.....
October	572,897	35.5	343,962	20.6	686,741	41.1	.....	.....
November	430,358	26.7	366,119	22.7	681,820	42.8	.....	.....
December	600,639	38.7	418,630	27.0	661,515	42.7	.....	.....
Plus or minus yearly adjustment	.. (44,283)	...	(19,907)	...	.....	...	.....	...
Total for year	5,805,235	30.1	5,905,966	30.6	7,371,299	38.3	.....	...

*Revised.

Allis-Chalmers to Pay Bonus

ALLIS-CHALMERS MFG. CO., Milwaukee, will grant vacations with pay and make a bonus

payment in December amounting to 3 per cent of actual earnings between March 1 and Dec. 12, 1936. A continuance of the plan after this year will depend upon business conditions, it is stated.

Eight thousand of the employees to benefit under this program are

shop workers and 2000 are office employees, and of the total, between 6500 and 7000 are at work in the main works and general offices in West Allis, Wis., where employment at present is at the highest peak of all time.

Allis-Chalmers shop employees have not heretofore received vacations with pay; office workers formerly enjoyed this privilege until several years ago when strict economies became necessary. A partial restoration of the privilege was made during 1935.

New Name and Sales Plan for Askania

THE business in automatic regulation previously carried on by H. A. Brassert & Co., Chicago, in the iron and steel industry and by the American Askania Corp. in other industries, has been united and placed in the hands of a newly organized company which is now known as the Askania Regulator Co.

With the organization of the new Askania company, all sales and manufacturing to all industries will be concentrated within the new organization. The offices and the manufacturing plant of the new company remain the same as that of the old American Askania Corp. at 1603 South Michigan Ave., Chicago.

Mesta Gets J. & L. Continuous Sheet Mill

JONES & LAUGHLIN STEEL CORP., Pittsburgh, has let contracts for its new \$25,000,000 continuous strip mill. According to company officials this mill will be in operation within a year. Mesta Machine Co. has been awarded the contract for the hot and cold mills and auxiliary equipment. Contracts for motors, generators and auxiliary electrical equipment went to the General Electric Co. Additional contracts are to be let for excavation and erection of buildings. The site on Second Avenue at Bates Street, Pittsburgh, will comprise 23 acres, 21 of which will be under roof, and the new mill will be about ½ mile in length.

Horace T. Potts Co., East Erie Avenue and D Street, Philadelphia, has been appointed distributor of Shelf-X flat mesh steel, Red Top expanded metal and Red Top expanded metal accessories produced by United States Gypsum Co.



**EC&M TYPE WB
HEAVY DUTY BRAKES**

They permit 1/8" wear on the smallest size to—1/2" on the largest size.

When reblocking is necessary, a new block fits the wheel as accurately as the old one. This and other outstanding features are clearly illustrated in Bulletin 1004-A. Ask for a copy.



**The ELECTRIC CONTROLLER
and MFG. CO., CLEVELAND, OHIO**



**AUTOMATIC CONTROL for CRANES-MILL DRIVES and MACHINERY
BRAKES-LIMIT STOPS and LIFTING MAGNETS.**



PERSONALS

GEORGE L. ERWIN, JR., who resigned a few weeks ago as sales manager of the Kearney & Trecker Corp., Milwaukee, after having been associated with the company since 1922, has been appointed



GEORGE L. ERWIN, JR.

assistant vice-president in charge of sales of the Crane Co., Chicago. He will assist P. R. Mork, vice-president in charge of sales. In addition to the usual sales activities, he will also assist in the analysis of products, markets and other phases connected with merchandizing the company's products.

♦ ♦ ♦

DR. HEINRICH RIES, professor of geology and head of the department at Cornell University, has been awarded the Joseph S. Seaman Medal by the American Foundrymen's Association "for his outstanding services to the foundry industry and to the Association in the field of foundry sand research and control." David McLain, president of McLain's Systems, Inc., Milwaukee, has been awarded the J. H. Whiting Medal "in recognition of his contributions to the foundry industry in stimulating better melting practices."

♦ ♦ ♦

MUIR L. FREY, for the past 10 years chief metallurgist for the John Deere Tractor Co., Waterloo, Iowa, has been added to the metallurgical staff of the Republic Steel Corp., Cleveland. He will be identified with the company's Buffalo plant. He received his technical education at the University of

Missouri School of Mines and Metallurgy in 1923.

♦ ♦ ♦

J. O. DONOHUE has rejoined the sales staff, with office in Baltimore, of the New York Belting & Packing Co., Passaic, N. J. J. D. McLin, who had been connected with the company for 16 years prior to his leaving in 1932 to enter another phase of the rubber industry, will cover Nebraska, western Missouri, Oklahoma, Texas, Arkansas

and Louisiana from his headquarters in Dallas, Tex.

♦ ♦ ♦

ROBERT A. CAMPBELL, formerly associated with Steel & Tubes, Inc., Cleveland, has been appointed western sales manager, with offices at 919 North Michigan Avenue, Chicago, for the Standard Tube Co., Detroit.

♦ ♦ ♦

HARRY A. SCHULTZ, of the United States Steel Corp., has been made



In Step with the Times

ARE you keeping up with the tempo of today by using materials that require less machining, and reduce fabricating costs?

B & L Extra Wide Flats offer you these economies in making bed plates, stripper plates and backing plates for dies, patterns, jigs and other equipment parts.

These handy sections are cold drawn to uniform size, true flatness and close size tolerances, and free from surface blemish. Available in widths to 12" and thickness from 1/4" to 2"—cold sawed to accurate dimensions.

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Cold Finished Bars and Shafting • Ultra-Cut Steel • Special Sections • Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

chairman of the New York Citizens Family Welfare Committee to solicit contributions in the iron and steel industry.

NORBERT E. SMITH, who has been associated with Joseph T. Ryerson & Son, Inc., for the past 15 years, has been added to the sales staff of Inland Steel Co., Chicago. He will cover territory in Indiana, Ohio and Kentucky.

A. D. HEFFRON, JR., has been made Chicago district sales manager of the Babcock & Wilcox Tube Co., Beaver Falls, Pa. He will make his headquarters at 1502 Marquette Building, Chicago.

A. F. DOBBRODT, of the Chicago office of the Carboly Co., Inc., Detroit, has been transferred to the company's Milwaukee office at 2802 Atkinson Avenue.

J. BERRY MCOWEN, formerly connected with the Central Iron & Steel Co., has been made representative in western and central New York for the Tubular Service Corp., Brooklyn, N. Y.

RALPH W. BURK has been appointed sales manager for Kearney & Trecker Corp., Milwaukee, to succeed GEORGE L. ERWIN, JR., who recently resigned. Mr. Burk has been in the machine tool business for 20 years and has been with the Kearney & Trecker organization since 1927 as branch manager,

eastern sales manager, and assistant sales manager.

F. R. MAGILL, of 327 First Avenue, Pittsburgh, has been made representative in that territory for the Trabon Engineering Corp., Cleveland.

H. E. LEWIS has been elected chairman of the board of directors, Jones & Laughlin Steel Corp., Pittsburgh, to succeed G. M. LAUGHLIN, JR., who has resigned, effective April 7. Mr. Lewis has also been elected a director and a member of the executive committee of the company. W. C. MORELAND has resigned as vice-president and a member of the executive committee. Mr. Laughlin and Mr. Moreland will continue as directors of the corporation, and Mr. Laughlin will also continue as a member of the executive committee.

GEORGE A. RANNEY, chairman of the board of the Peoples Gas Light & Coke Co., Chicago, and formerly vice-president of International Harvester Co., has been elected a director of Westinghouse Electric & Mfg. Co.

J. G. WALDRON, who has been identified with the New York office of the Wheeling Steel Co. and its predecessors since 1919, has been made district sales representative in New York for the Newport Rolling Mill Co., Newport, Ky. He will make his headquarters at 30 Church Street.

OBITUARY

WILLIAM A. FORBES, since Jan. 1 vice-president of the United States Steel Corp., died in New York on April 7, aged 59 years. He was born in Stockton-on-Tees, England, where he received his primary



W. A. FORBES

education. He later attended high school in Middlesbrough and won a scholarship endowed by Sir I. Lowthian Bell. After leaving high school he worked for over two years in the laboratory of the Stockton Malleable Iron Works, leaving that position in 1895 to come to the United States. He entered the Homestead works of the Carnegie Steel Co. as assistant chemist in the laboratory and was employed in that capacity until 1900. He was transferred to the National Tube Co. at McKeesport, Pa., where he served successively as assistant chief chemist, chief chemist and then assistant superintendent of blast furnaces until 1907. Beginning with the latter date he devoted himself exclusively to the coke committee, with headquarters at the Joliet works of the Illinois Steel Co. during the construction of the first plant of Koppers by-product coke ovens. Mr. Forbes was transferred to the New York office of the Steel corporation in 1908 and was placed in charge of sales of all coke by-products of subsidiary companies. In 1928 he was appointed assistant to the president, a position he held until his promotion to the vice-presidency in January, this year.

DANIEL M. CLEMONS, formerly vice-president in charge of ore, gas and railroad properties of the United States Steel Corp., and one of the partners of Andrew Carnegie,

AMERICAN SPEED-SET METAL Numbering Machines

Note simplicity of operation. It will number large heavy machinery as well as small parts.

Write for new catalog of special machines for all kinds of metal numbering.



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died at his home in Pittsburgh on April 7, aged 83 years. He was born in Center County near Bellefonte, Pa., in 1853. He began his career at the Scotia ore mine of Carnegie Brothers & Co., of which he became superintendent in 1885. A few years later he was transferred to Pittsburgh as manager of the Youghioghenny and Larimer coke works of the Carnegie company. He had charge of the ore properties and was general manager of the company, later president of the Carnegie Natural Gas Co., and president of Pittsburgh Steamship Co. Mr. Clemson became one of the confidential advisers to Andrew Carnegie, and was responsible for the purchase of many of the properties which went to form the Carnegie Steel Co. He retired from active business about 10 years ago.

❖ ❖ ❖

C. G. EMIL LARSSON, bridge engineer and for many years affiliated with American Bridge Co., Pittsburgh, died suddenly at Winter Haven, Fla., on April 1, aged 71 years. He was born in Sweden and studied engineering there before coming to the United States. He became associated with the Edgemoor Bridge Works, Wilmington, Del., which was merged with the American Bridge Co. He remained with this organization until 1933.

❖ ❖ ❖

JOHN ELLIS GALLAGHER, one of the organizers of the Apollo Steel Co., Apollo, Pa., died at his home in that city on April 8, aged 58 years. He was a graduate of Indiana State College. At the time of his death he was a director and assistant treasurer of the Apollo company.

❖ ❖ ❖

WALTER H. MOORE, Cleveland district sales manager Haynes Stellite Co., died April 9 after three weeks' illness, age 56 years. He had been connected with the company since 1923 and had been district sales manager since 1926. Previously he was production manager of the Foote-Burt Co. and tool supervisor of F. E. Stearns Co., Cleveland.

❖ ❖ ❖

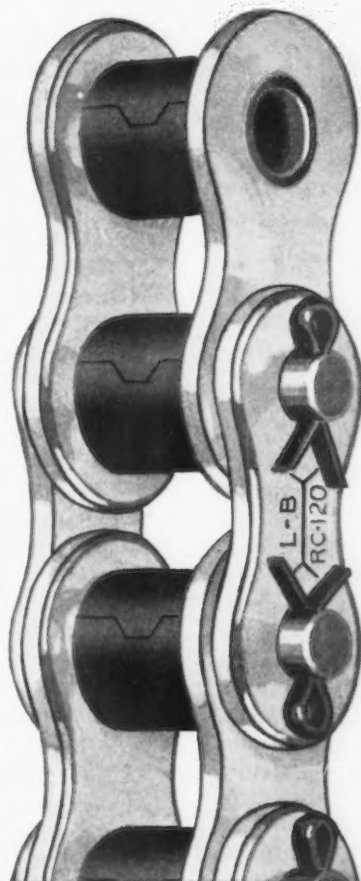
JOSEPH D. SARGENT, long identified with Sargent & Co. and son of that company's founder, died on April 9, at Hurley, N. Y., after a long illness. He was graduated from Yale in 1889, and immediately entered his father's business. He retired in 1928.

❖ ❖ ❖

HARRY U. HART, vice-president and chief engineer, Canadian Westinghouse Co., Ltd., died suddenly at Hamilton, Ont., on March 15.

Mr. Hart was born at Covington, Ky., and received his education at Marietta College, Ohio, and the Massachusetts Institute of Technology. He entered the employ of the Westinghouse Electric & Mfg. Co. in 1893 as a student apprentice. In 1899 he was appointed designing electrical engineer for the French Westinghouse Co., later being appointed chief engineer of the company. He became chief engineer of the Canadian Westinghouse Co. in 1905, one year after the incorpora-

tion of the Canadian company. In 1923 he was made general manager and chief engineer, and vice-president and chief engineer in 1928. Mr. Hart was a director of the Canadian Radio Patents, Ltd., Thermionics, Ltd., and Westinghouse Neon Co., Ltd. He was a member of the Engineers Club of Toronto, the American Institute of Electrical Engineers, and the Engineering Institute of Canada, of which he was a charter member of the Hamilton branch.



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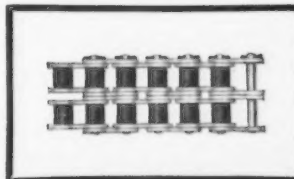
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● For accurate pitch, smooth operation, long life and dependability, specify Link-Belt Silverlink roller chain. It is the result of unending research work and of the long experience of the leader in the art of chain manufacture.

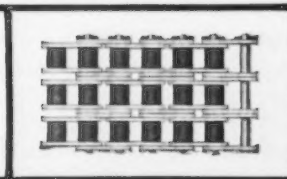
Silverlink is made in $\frac{3}{8}$ " to $2\frac{1}{2}$ " pitch, in single and multiple strand types, with a complete range of sprocket wheels and attachments. Complete drives—chains and sprocket wheels—from $\frac{1}{4}$ to 225 H. P., in speed ratios of 1 to 1, up to 8 to 1, are stocked by distributors, nationally.

LINK-BELT COMPANY

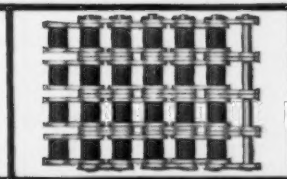
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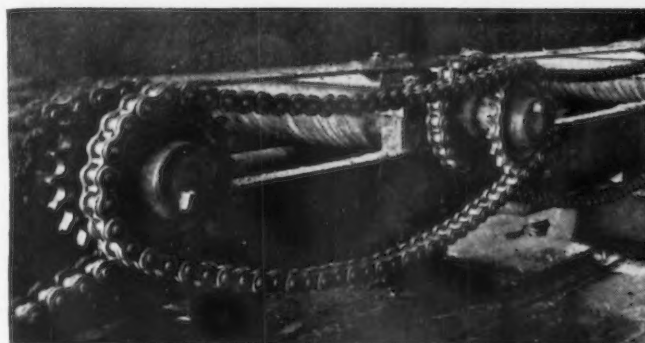
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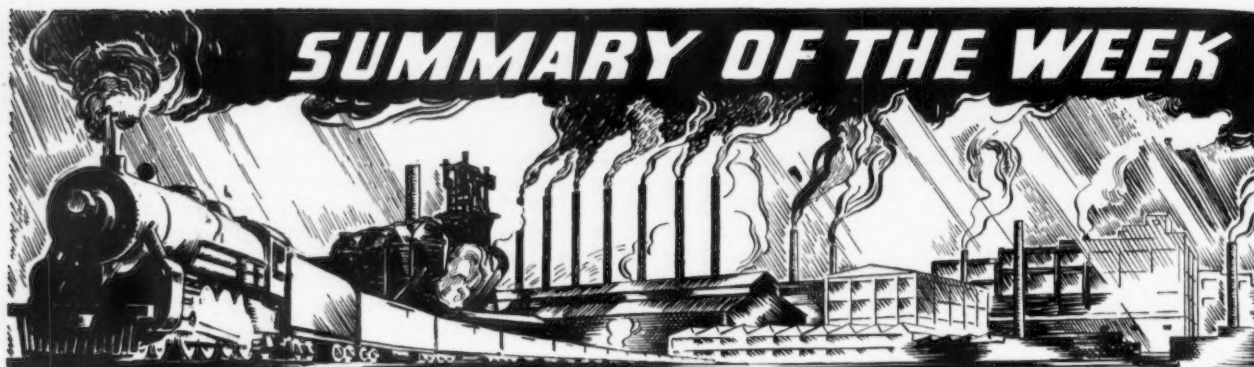
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**ROLLER
CHAIN
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SENT
ON
REQUEST**



... Expanding demand for steel lifts ingot rate two points to 68 per cent of capacity.

o o o

... All major outlets are represented in broad buying movement.

o o o

... Consumer pressure against second quarter prices and quantity differentials is firmly resisted.

o o o

... Scrap price trend mixed with composite up slightly.

EXPANDING demand for finished steel products is noticeable this week from practically all consuming outlets. The automobile industry is pushing for deliveries on May schedules. Railroad buying has been accelerated. Shipments to farm implement makers are well sustained and general agricultural demand is stronger. Heavy construction activity is dragging, but the building industry is taking large tonnages of steel on old contracts. Tin plate buying is at an improved rate and sheet and strip steel is moving to miscellaneous manufacturers in greater volume.

In fact, the current picture offers little indication of a reaction in the rate of steel production for at least another month. Ingot output this week is at 68 per cent of capacity, a rise of two points. While a leveling-off at around 70 per cent would not be surprising, the strong and diversified character of current demand would seem to preclude any tendency to decline.

THE recent heavy production of light finished steel products is apparently enabling mills to clean up shipments against low-priced first quarter orders sooner than they had anticipated. In some instances, consumers are placing new orders for urgent shipment and the automotive industry is making new commitments for May and June assemblies.

This has led to a rather early test of second quarter quotations, particularly as they involve

quantity differentials. As had been anticipated, buyers are offering 150-ton orders if shipments may be extended over a period and are also suggesting the placing of aggregate tonnages involving several sizes and specifications. Mills are steadily resisting this pressure and are even considering the extension of the quantity differential system to other finished steel products.

THE week's railroad purchases have been impressive. The Baltimore & Ohio has placed 25,000 tons of rails; the Rock Island has completed the allocation of 40,000 tons, of which 26,000 tons was ordered in the previous week, and the Chicago & Eastern Illinois has awarded 6000 tons. Miscellaneous rail releases at Chicago total 25,000 tons and an equal tonnage of accessory business has reached mills in that district.

The Erie has ordered 800 freight cars and the Missouri Pacific is asking for bids on 2000. Three thousand cars for the Pacific Fruit Express are still pending and the Chesapeake & Ohio is expected to inquire soon for 5000 to 6000 units. The New York Central has ordered seven diesel-electric locomotives and the Louisiana & Arkansas has placed five steam locomotives.

AUTOMOBILE assemblies are rapidly approaching the 120,000-a-week level and March sales figures were so encouraging that rising output seems likely to continue well into May. Stamping plants are busy on automotive parts and makers of refrigerators, household appliances, office equipment and steel barrels and drums are stepping up production.

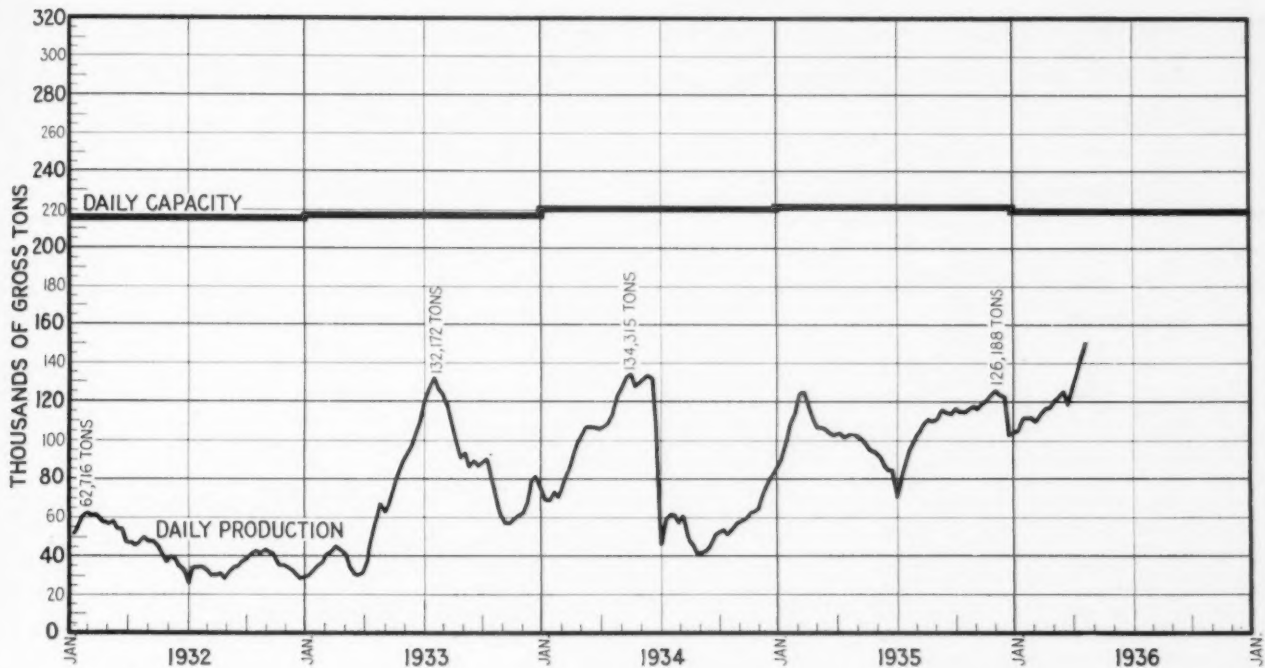
In the construction field, the trend of steel demand is somewhat mixed. Large public-financed projects are not appearing so freely, although shipments to those under way are heavier. The bright side of the picture is reflected in light building activity, which is approaching the highest rate since 1930. In the metropolitan New York district new building plans filed in the first quarter were more than double those of the first three months of 1935.

SCRAP prices reflect no definite trend. No. 1 heavy melting steel at Chicago has reacted from last week's decline, and THE IRON AGE scrap composite is up 5c. a ton to \$14.63. The finished steel composite is unchanged at 2.097c. a lb., and the pig iron index is holding at \$18.84 a gross ton.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ending:			
April 20, 1935	April 21, 1934	April 22, 1933	April 23, 1932		
149,241	144,852	102,943	114,498	58,502	47,578



STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Same Week Last Month	Weeks Ending:	
				April 20, 1935	April 21, 1934
Pittsburgh	64.0	56.0	28.0	35.0	40.0
Chicago	68.0	*68.0	63.5	50.0	54.0
Valleys	72.0	70.0	68.0	55.0	59.0
Philadelphia	45.0	43.0	41.0	32.0	40.0
Cleveland	79.0	82.0	79.0	52.0	60.0
Buffalo	58.0	56.0	43.0	35.0	59.0
Wheeling	80.0	80.0	58.0	77.0	70.0
Southern	67.0	67.0	67.0	50.0	54.0
Ohio River	78.0	79.0	76.0	70.0	65.0
Western	90.0	90.0	70.0	30.0	35.0
St. Louis	80.0	80.0	80.0	44.0	38.0
Detroit	100.0	100.0	100.0	88.0	100.0
Eastern	90.0	80.0	60.0	35.0	55.0
Aggregate	68.0	66.0	54.0	46.5	52.0
Average Year to Date	55.5	54.7	52.8	49.0	42.3

* = Revised.

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended				Year to Date	
	Apr. 14, 1936	Apr. 7, 1936	Mar. 17, 1936	Apr. 16, 1935	1936	1935
Fabricated structural steel awards.....	10,575	14,850	31,750	32,035	312,260	258,150
Fabricated plate awards.....	600	690	1,525	4,410	86,245	60,820
Sheet steel piling awards.....	200	300	0	150	15,405	5,715
Reinforcing bar awards.....	3,500	4,700	2,060	16,955	126,765	88,990
Total Lettings of Construction Steel..	14,875	20,540	35,335	53,550	540,675	413,675



... Pittsburgh district steel output rises eight points to 64 per cent; production at Wheeling unchanged.

o o o

... Consumers continue to press for quick deliveries.

o o o

... Tin plate operations rise to 80 per cent of capacity.

PITTSBURGH, April 14.—Ingot output in the Pittsburgh district is up eight points this week to 64 per cent of capacity, while the Wheeling remains unchanged at 80 per cent.

A fair amount of new business, coupled with the hurried production of first quarter tonnage, is exerting its influence this week. There is evidence that practically all steel being moved to users is going into consumption. Producers are being pushed for shipment to such an extent that even on new business customers are telling them they will take the orders elsewhere unless material reaches them as requested.

There has been some effort on the part of consumers to have mills modify the recent quantity differential plan as far as shipping to one destination at one time is concerned. Some buyers would like to order large tonnages and take them over a period of time while others wish to name different destinations on the same order. All of these efforts have been unsuccessful as the mills have refused to change the practice set up in recent formal announcements.

There has been a good improvement in demand for bars with automotive and implement makers taking a goodly share. Demand for cold-rolled bars is active and much of this tonnage has gone to jobbers to replenish stocks.

Specifications for heavy materials continue fair with hopes being placed on a revival of railroad car building on a larger scale at some time during this quarter. Structural inquiries during the past week were encouraging in that many of them were for private

projects. Awards are still receiving their support from public works projects.

Sheet production this week has shown a decided improvement, moving up to 70 per cent. A fair number of new specifications are being received, although not enough to test recent changes in the selling practices on this item. Tin plate production has risen to 80 per cent and the volume of orders is growing at a fast rate. Strip production and shipments remain at recent levels. Few orders are trickling in. However, they are a little better than expected by producers.

Pig Iron

There is no unusual activity in this market. With prices stabilized consumers continue to order in carload lots without doing much stocking in their own plants.

Semi-Finished Steel

Production continues heavy, and shipments to non-integrated mills are at about the same rate as last week. Movement of sheet bars and wire rods continues at a satisfactory rate. While there is nothing unusual in the amount of specifications being received, nevertheless orders are coming in in fair volume. With the future prospects bright for wire, tin plate and sheets, the activity in sheet bars and rods will probably continue.

Bolts, Nuts and Rivets

Miscellaneous orders continue to be a feature of this market, and the recent improvement in shipments and production of nuts and bolts has been holding. With a probable increase in specifications from railroads as soon as car build-

ing programs have been fully formulated, producers are looking forward to a good second quarter.

Bars

Although producers are still bending every effort to complete first quarter shipments by the middle of this month, there has been a good volume of new specifications received. A breakdown of consumer requirements shows steel being ordered by automobile, implement makers and miscellaneous sources. There has been a noticeable increase in specifications from pole line manufacturers during the past month. Some large buyers of bars have attempted to place specifications in accordance with the quantity differential, but have asked the mill to ship the material one carload at a time, hoping thus to defeat the purpose of the recent change in selling practice. This attempt has been unsuccessful as mills have insisted upon immediate shipping of one size to one destination.

Reinforcing Steel

Second quarter prices on reinforcing bars have been formally reaffirmed at 2.05c., Pittsburgh, to consumers; 1.85c. to jobbers for cut lengths, and 1.75c. to jobbers for mill lengths of 40, 50 and 60 ft. Meanwhile new orders are being booked at a fairly satisfactory rate, and as a result of heavy releases for specific jobs mill backlogs are very heavy. Production of reinforcing bars during the past month has been greater than at any time during the past five years in this territory.

Cold-Finished Bars

Demand this week does not show any improvement over last week and the bulk of orders are coming from jobbers who evidently had reduced their stocks due to the recent heavy demand from consumers. Miscellaneous buying takes precedence this week over automobile requirements, although it is expected that this situation will be more or less temporary.

Steel Sheet Piling

Activity in this market continues dull, with a little tonnage going to State highway departments covering requirements for replacement of bridges washed out recently. A few large Government projects, which would have required heavy tonnages of steel sheet piling, have been postponed for the time being.

Plates and Shapes

Volume of specifications for plates and heavy material is coming along at a fair pace. The distinct possibility of a large car-building program on the part of

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Apr. 14, 1936	Apr. 7, 1936	Mar. 17, 1936	Apr. 16, 1935
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.26
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'ti.....	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham†.....	15.50	15.50	15.50	14.50
No. 2 foundry, Chicago*.....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.2528	25.2528	25.2528	24.04
Ferromanganese, seab'd carlots.....	75.00	75.00	75.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

Per Lb.:	Apr. 14, 1936	Apr. 7, 1936	Mar. 17, 1936	Apr. 16, 1935
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh...	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary...	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, Pgh	1.85	1.85	1.85	1.85
Hot-rolled sheets No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.60
Wire nails, Chicago dist. mill	2.15	2.15	2.15	2.65
Plain wire, Pittsburgh.....	2.40	2.40	2.30	2.30
Plain wire, Chicago dist. mill	2.45	2.45	2.35	2.35
Barbed wire, galv., P'gh.....	2.60	2.60	2.50	3.00
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.55	3.05
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh...	\$15.75	\$15.75	\$15.75	\$11.50
Heavy melting steel, Phila...	13.75	13.75	13.75	10.00
Heavy melting steel, Chicago	14.37 1/2	14.25	14.75	9.75
Carwheels, Chicago.....	14.00	14.00	14.00	10.50
Carwheels, Philadelphia....	14.75	14.75	14.75	11.25
No. 1 cast, Pittsburgh.....	15.25	15.25	15.25	12.25
No. 1 cast, Philadelphia.....	14.25	14.25	14.25	11.00
No. 1 cast, Ch'go (net ton)..	12.50	12.50	13.00	9.00
No. 1 RR. wrot., Phila.....	13.25	13.25	13.25	10.75
No. 1 RR. wrot., Ch'go (net)	13.00	13.00	13.25	8.00

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh.	28.00	28.00	28.00	27.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	28.00
Slabs, Pittsburgh.....	28.00	28.00	28.00	27.00
Forging billets, Pittsburgh..	35.00	35.00	35.00	32.00
Wire rods, Nos. 4 and 5, P'gh	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Bars, Chicago.....	1.90	1.90	1.90	1.85
Bars, Cleveland.....	1.90	1.90	1.90	1.85
Bars, New York.....	2.20	2.20	2.20	2.13
Plates, Pittsburgh.....	1.80	1.80	1.80	1.80
Plates, Chicago.....	1.85	1.85	1.85	1.85
Plates, New York.....	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago...	1.85	1.85	1.85	1.85
Structural shapes, New York	2.06 1/4	2.06 1/4	2.06 1/4	2.05 1/4
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.95
Hot-rolled strips, Pittsburgh.	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh.	2.60	2.60	2.60	2.60

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$3.65	\$3.65	\$3.65	\$3.85
Foundry coke, prompt.....	4.25	4.25	4.25	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.50	9.25	9.25	8.75
Lake copper, New York.....	9.62 1/2	9.37 1/2	9.37 1/2	9.12 1/2
Tin (Straits), New York....	47.12 1/2	47.25	48.25	51.12 1/2
Zinc, East St. Louis.....	4.90	4.90	4.90	4.07 1/2
Zinc, New York.....	5.27 1/2	5.27 1/2	5.27 1/2	4.42 1/2
Lead, St. Louis.....	4.45	4.45	4.45	3.55
Lead, New York.....	4.60	4.60	4.60	3.70
Antimony (Asiatic), N. Y...	13.50	13.50	13.50	14.25

The Iron Age Composite Prices

Finished Steel

April 14, 1936	2.097c. a Lb.
One week ago	2.097c.
One month ago	2.084c.
One year ago	2.124c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	HIGH	LOW
1936.....	2.130c., Jan. 7;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

	\$18.84 a Gross Ton
	18.84
	18.84
	17.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1936, Jan. 7;	\$18.84,	17.90,
Nov. 5;	17.83,	May 14
May 1;	16.90,	Jan. 27
Dec. 5;	13.56,	Jan. 3
Jan. 5;	13.56,	Dec. 6
Jan. 6;	14.79,	Dec. 15
Jan. 7;	15.90,	Dec. 16
May 14;	18.71,	Dec. 17
Nov. 27;	18.59,	July 24
Jan. 4;	17.54,	Nov. 1

Steel Scrap

	\$14.63 a Gross Ton
	14.58
	14.75
	10.42

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
Feb. 25;	\$14.75,	\$13.33,
Dec. 10;	13.42,	April 22
Mar. 13;	13.00,	Sept. 25
Aug. 8;	12.25,	Jan. 3
Jan. 12;	8.50,	July 5
Jan. 6;	11.33,	Dec. 29
Feb. 18;	15.00,	Dec. 9
Jan. 29;	17.58,	Dec. 3
Dec. 31;	16.50,	July 2
Jan. 11;	15.25,	Nov. 22

the railroads is the cause for some optimism in this market.

Structural inquiries during the past week have had a note of encouragement in them due to the appearance of several private projects. Although not necessarily large in tonnage, they nevertheless indicate a trend. Among this type of new inquiry are askings for steel to be used in such projects as power house additions, factory building, machine shop and warehouse facilities. Structural awards were mostly State highway projects, with three fair-sized tonnages going for private building extensions and construction.

Inquiry is being circulated in this territory by the Hatfield-Campbell Creek Coal Co. of Cincinnati for 20 to 25 welded or riveted steel coal barges, involving approximately 3000 to 3500 tons of fabricated steel.

Tubular Products

Demand in this market continues along recent trends, with oil-country goods comprising the bulk of the tonnage. However, there are still ample signs of boiler tube buying on both the part of railroads and manufacturing industries.

Wire Products

Interest in this market still centers on production and shipments, and mills expect to clear first quarter bookings by the middle of April. Meanwhile mill stocks have been reduced in the rush of orders to consumers, and there is a probability that production will continue for replenishment purposes. Within a short time heavy requirements from the farming interests probably will be forthcoming, inasmuch as many of the roads throughout the farm regions, which were completely blocked during the winter, are now being opened up and repaired.

Tin Plate

Demand for tin plate continues at a very good rate, with packers' requirements being the outstanding feature. However, general line can makers have increased their requirements over the past several weeks and are accounting for a fair percentage of the total tonnage. Tin plate production this week is at approximately 80 per cent.

Sheets

Sheet production this week has increased sharply to 70 to 72 per cent. While shipment and production have been and are the most important part of the picture, nevertheless there has been a satisfactory increase in specifications over last week. Automotive manu-

facturers comprise some of this tonnage, while barrel manufacturers and miscellaneous account for the balance. The mills are still working on first quarter business, but with second quarter volume increasing production will undoubtedly be at a high rate during the balance of the month. Consumers are still sending in requests to ship material at a much earlier date than their first instructions.

Strip Steel

Strip steel production in this district is at approximately 70 to 74 per cent. Emphasis is still being placed on production and shipment. However, one of the local interests has received quite a fair amount of orders since the first of the month approximating about 30 to 40 per cent of those during the month of March. Automotive and miscellaneous tonnages comprise the

make-up of the orders, with some inquiry continuing from implement makers.

Coal and Coke

While the consumption of domestic coal and coke is practically at an end, industrial coke on the other hand has had a fairly good movement during the past week, and shipments have been moving forward steadily to foundries. Some of the tonnage has been used to dry out plants inundated recently, but the bulk of the material is being consumed as a result of a greater activity on the part of the foundries. Movement of beehive coke has stepped up during the past week or so. With domestic lump coal movement practically at an end and with requirements coming in from cement manufacturers, slack accumulations have about disappeared.



... Lettings again are lower at 10,575 tons compared with 14,150 tons last week.

□ ○ □

... New projects also decline to 19,735 tons.

NORTH ATLANTIC STATES

Burlington-Colchester, Vt., 350 tons, bridge, to Bethlehem Steel Co.

Turners Falls-Greenfield, Mass., 300 tons, bridge, to Bethlehem Steel Co.

Worcester, Mass., 200 tons, parcel post building, to West End Iron Co.

Hinsdale, N. H., 150 tons, paper mill, to an unnamed fabricator.

Warwick, R. I., 100 tons, school, to Providence Steel & Iron Co.

Brooklyn, 525 tons, factory building, Leviton Mfg. Co., to American Bridge Co.

Erie County, N. Y., 170 tons, State highway bridge, to American Bridge Co.

Kenmore, N. Y., 100 tons, municipal hall, to R. S. McManus Steel Construction Co.

Ulster County, N. Y., 230 tons, State highway bridge, to American Bridge Co.

Berlin, N. Y., 215 tons, grade school, to James McKinney & Son.

Wingdale, N. Y., 160 tons, assembly hall, Harlem Valley hospital, to Utica Steam Engine & Boiler Works.

Binghamton, N. Y., 230 tons, bridge arch centers, to Phoenix Bridge Co.

Brooklyn Manor and Bayside, Long Island, 350 tons, bridges, to Bethlehem Steel Co.

Riverhead, Long Island, 250 tons, high school, to August Bellon Iron Works.

Jersey City, N. J., 300 tons, science hall, St. Peters College, to Oltmer Iron Works.

Westfield, N. J., 480 tons, grade crossing elimination, to Bethlehem Steel Co.

Reading, Pa., 120 tons, high school, truss materials, to Phoenix Bridge Co.

Clearfield, Pa., 525 tons, highway bridge, to American Bridge Co.

Wilmington, Del., 110 tons, L. D. Cope-land residence, to Bethlehem Steel Co.

SOUTH AND SOUTHWEST

Kenton County, Ky., 112 tons, for State highway department, to Jones & Laughlin Steel Corp.

Big Stony Gap, Va., 165 tons, coke and coal bin, to Ohio Structural Steel Co.

Wilmington, N. C., 250 tons, post office, to Bethlehem Steel Co.

Crossett, Ark., 1000 tons, paper mill for Crossett Lumber Co., to Ingalls Iron Works Co.

(CONTINUED ON PAGE 86)

CHICAGO



... **Steel ingot production adjusted downward to 68 per cent.**

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... **Railroad buying is outstanding market factor.**

o o o

... **Scrap market resists declining tendency and heavy melting steel is advanced.**

CHICAGO, April 14.—The April movement of iron and steel products is steady and at a high rate, with the exception of wire products demand for which is declining slightly as gaged by the excellent tonnage moved in March. This change in the wire picture is not alarming and sellers believe that before the end of the month a showing will be made that will compare favorably with any recent fourth month including that of 1930.

A slight adjustment in ingot output brings the average to 68 per cent of capacity, within a shade of the rate a week ago.

Sales and specifications, both rather strongly influenced by rails, show slight improvement, and all indications point to a high rate of output throughout the remainder of the month.

Railroad activity is still a feature of the market. The Missouri Pacific is definitely in the market for 2000 cars, the Santa Fe has ordered an eight-car stainless-steel train, the Milwaukee Road a streamlined locomotive, and the Erie 800 cars. The New York Central has ordered seven Diesel locomotives and rail business has been placed by the Monon, Chicago & Eastern Illinois, Wheeling & Lake Erie and the Rock Island. Fresh inquiries promise activity in the electrical cable market which has been dormant for a number of years.

The scrap market is beginning to show resistance against pressure for lower prices and a mill purchase of heavy melting steel at \$4.50 is reported.

Pig Iron

Releases against old orders are growing and the foundry melt in

this district is showing improvement over the March average. This gain is general and covers practically all lines of foundry work. New business is in moderate volume as buyers remain in the frame of mind to take iron in close conformity with actual needs.

Rails

The Rock Island has completed its purchases, which total 40,000 tons, the business having been taken by the Carnegie-Illinois, Inland and Colorado mills. Other new orders include 6000 tons by the Chicago & Eastern Illinois, 1000

tons by the Monon and 2500 tons by the Wheeling & Lake Erie. Shipping instructions to mills call for 25,000 tons of rails and other important releases are expected in the near future. The only large Western railroad that has not come into the market is the Great Northern. Miscellaneous accessory business reaches the total of 25,000 tons.

Bars

New buying and fresh specifications are steady and close to the peak of the year to date. Automobile plants and parts makers are exceptionally busy and their tonnages account for most of the gain in recent weeks. It is reported here that April assemblies of automobiles may reach 500,000 units. Cold-drawing shops and forgers report business as being exceptionally brisk and farm implement manufacturers are busily engaged buying steel for harvesting machinery. Tractor plants are also buying more steel and the farm implement group is freely predicting that this year will be the best for them since 1929.

Plates

This market holds better promise on the belief that more tonnage is to come from miscellaneous users, whereas little can be expected from the heavy consuming lines such as tanks and pipe lines. The railroad freight car market still looks good with a fresh inquiry for 2000 cars by the Missouri Pacific

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and possible early placement of 3000 cars by the Pacific Fruit Express. A development regarding Diesel-electric locomotives is that built-up rolled steel frames are being tried out to replace the cast steel product. Almost all Western railroad shops are doing some maintenance work and mill support from that direction is satisfying.

Structural Material

Fabricators report some improvement in private projects, but it is strongly noticeable that overhead crossing work is forming the backbone of the market. A new department store is promised for Chicago and a stamping plant at Detroit will take 1400 tons. New awards at less than 2000 tons are unusually slim, but State highway work promises to raise this figure within the next few weeks.

Wire Products

April business is showing a very slight taper from the volume of March, but sellers are inclined to put the two months together and when they do they visualize a total volume that is the best for any two like months since 1930. There is better demand for wire rope and inquiries for electric cable point the way for that commodity once again to become active. On the whole, prices are on a better footing, with exception of nails in the Texas area, where price cutting is a sport. Foreign importations have something to do with the situation, though foreign-made nails

have recently gone up in price. Threats of war in the Far East and in Europe are helping to hold down importations of barbed wire into this country.

Hot-Rolled Strip

New orders are liberal, the aggregate for the week being in excess of 7000 tons. The bulk of the movement is to automobile plants, though agricultural implement manufacturers are taking sizeable quantities.

Sheets

Some units are now engaged at full capacity, and with average deliveries near the 30-day mark, the matter of consumers' needs is becoming a serious one. Practically all light manufacturing lines in this area report substantial business, with the outlook promising.

Reinforcing Bars

Inquiries are somewhat more numerous but bar orders are slow and will probably remain so until state road programs get under way on a broader scale. Illinois has a large letting near at hand and Indiana has opened bids on 1000 tons of bridge work. The Jane Addams housing project, Chicago, is still open and it appears that the second or the third bidder may get the general contract. The Sanitary District, Chicago, is taking bids on 1000 tons and it has closed for 300 tons. Prices are steady on the general run of business which is char-

acterized by small tonnages. Real tests are still needed to prove price stability.

Cast Iron Pipe

Releases remain active and there is some new public buying but it is characteristic of practically all transactions that tonnages involved are small. The weather is such that contractors can push jobs through to completion and at the present rate of activity most contracts now under way will be completed at an early date. That raises the question of summer business which looks none too promising at this time. There are those in the trade who anticipate a rush of fall work, which will be closely allied with political considerations.



... San Francisco Bay exposition to take large tonnage.

o o

... Other large jobs come out in West.

SAN FRANCISCO, April 14.—Plans and specifications for various units of the exposition to be held on Yerba Buena Shoals in San Francisco Bay are rapidly being completed and bids may be called for toward the end of the quarter. Advance construction, estimated to cost \$3,516,500, will include two permanent airplane hangers, airport terminal building, five major exhibit buildings and a ferry terminal building. Estimates of steel tonnages involved are not yet available.

At Sheridan, Wyo., new bids will be opened April 22 on waterworks improvements in which 2700 tons of plates or 4300 tons of cast iron pipe are included in the alternates. Bids are expected to be opened at San Francisco within 30 days on an extension to the Hetch Hetchy pipe line involving 1500 tons of plates.

Southern California continues to hold its more favorable rate of activity while lettings near San Francisco are slightly improved. Soule Steel Co. has taken 490 tons of bars for a state building at Sacramento and 400 tons of bars went to Truscon Steel Co. for a similar building at Seattle. Four double hangers at Hickman Field, T. H., will involve 2000 to 3000 tons of shapes.

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... Mill operations at high level.

... Pig iron business holds up; and additional blast furnace is blown in.

BUFFALO, April 14.—General plant operation at the Bethlehem Steel Corp. has been stepped up to 70 per cent with all 12 mills in operation. Seneca sheet division is operating at 80 per cent or better, and at the new strip mill hot and cold sections are in operation. Republic Steel Corp. is operating four open-hearths and Wickwire-Spencer Corp., one.

A Buffalo fabricator has been given the contract for fabricating 125 tons for the new Tonawanda Town Hall. A 100-ton job for the Perrot Milling Co. is being figured and will be announced probably this week. This job was mentioned some weeks ago, but had hung fire for some time. There is a good volume of small-sized fabricating jobs moving, and this applies also to reinforcing bars.

Pig iron shipments are holding up surprisingly well. Foundries show fairly steady operation and all types are affected. Producers are awaiting the opening of the barge canal season in order to make shipments east. This will occur probably the last week in April.

An additional blast furnace has been lighted at the Lackawana plant and four are now blowing.

Herman H. Lind to Give Radio Address

HERMAN H. LIND, general manager, National Machine Tool Builders' Association, will discuss the domination of man by machines on a program of the National Broadcasting Co., Thursday, April 16, from 9.30 to 10.30 p. m. The program which is under the auspices of America's Town Meeting of the Air will also feature talks on the subject by Ralph Borsodi, president, Borsodi Analytical Bureau and Walter Rautenstrauch, professor of industrial engineering, Columbia University.

The "Boss" gave me a pat on the back this morning!



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You may have to take the initiative to start your men searching for possible savings. There could be, however, no more convenient way than just calling your local Standard Oil (Indiana) office—or suggesting to one of your department men: "Why not call in a Standard Oil Engineer?"

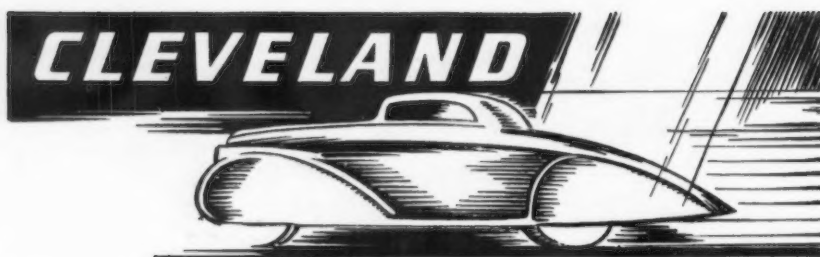


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**STANDARD OIL COMPANY
(Indiana)**

CORRECT LUBRICATION



... Steel ingot output declines slightly.

o o o

... Demand for sheets from automobile makers registers gain.

o o o

... Erie orders 800 freight cars.

CLEVELAND, April 14. — With a continued heavy demand from the motor car industry and a steady volume of orders from miscellaneous consumers, business in finished steel is holding to recent volume.

Ingot output in the Cleveland-Lorain district declined three points this week to 79 per cent of capacity, one open-hearth furnace

having been taken off in Lorain. The Cleveland steel plant of the Republic Steel Corp. and the Riverside Works of the Otis Steel Co. are operating at 100 per cent.

Local sheet and strip mills continue to maintain full operating schedules. Demand for sheets from automobile manufacturers took an upward spurt during the week. Some of the motor car companies

placed orders for production requirements during May and others that are running low on some sizes made new purchases for shipment as soon as possible. Most sheet mills will complete shipments against first quarter contracts by April 15, but have accumulated enough tonnage to keep them at good operating levels through the month or longer. Mills now have their rolling schedules so well filled on some products that buyers who have become accustomed to securing almost immediate deliveries now find that they must wait a week or two for shipment.

The Erie Railroad has purchased 800 freight cars, distributing the orders between three car companies, and also has placed track fastenings required for its recent purchase of rails. The Chesapeake & Ohio inquiry for 5000 or more cars is expected out this week.

The new price schedules were tested fairly well by sales during the week and apparently are being maintained, although there has been considerable pressure from sheet consumers to secure a modification of the requirement that calls for the entire shipment at one time to obtain the quantity deduction for the total purchase.

Pig Iron

Business so far in April has equalled that in the corresponding period in March, demand being most active from automotive foundries in Michigan and Indiana. Sales in the northern Ohio territory are rather light, as many foundries have sizable stocks of low-price iron taken in during March. Manufacturers of products making their own castings have become busier but business with jobbing foundries has not shown much revival.

Sheets

Demand from the automotive industry continues heavy. Orders from that source during the week were fairly numerous and while none was for a large lot, they made considerable tonnage in the aggregate. Much of the business is for May production schedules. Automotive inventories are low and some of the car manufacturers appear to be running short of certain sizes and are calling for delivery in two or three weeks. Stamping plants making automobile parts continue to order freely. Miscellaneous demand is good. Some refrigerator manufacturers are making additional purchases but others have accumulated good stocks. Mills have filled practically all the sheet orders that were placed at the prices prevailing before the adoption of the second quarter price



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schedules. These prices appear to be firmly adhered to, although some consumers have attempted unsuccessfully to make 150-ton purchases and have shipments spread out over two or three weeks. Some mills have well-filled schedules for four to six weeks for deep-drawing sheets.

Strip Steel

New business is coming from automobile manufacturers in fair volume. Demand from parts makers is rather light, as some of the larger parts-making plants have put in large stocks which are expected to carry them well through the quarter.

Iron Ore

A few additional sales of a few small lots have been made and the Ford Motor Co. is expected to make purchases within the next day or two against its inquiry for 490,000 tons. Present ice conditions in Lake Superior make it doubtful whether shipments can be started from the head of the lakes before about May 1. As a result of the extremely severe winter the ground in the Mesabi district is still frozen to a depth of several feet and some stripping operations have had to be delayed and this will slow up the start of ore shipments from that district.

Fluorspar

Producers are again quoting a price for a barge shipment which was withdrawn during the recent floods, naming the \$19 price that had been in effect before river navigation was stopped.

Bars, Plates and Shapes

New business in bars continues to come in good volume from forge shops for automotive work and miscellaneous demand is well maintained. New structural projects in Ohio include three private buildings requiring 1250 tons of shapes. Ohio will take bids April 17 for 750 tons for a grade crossing elimination at Bedford. Demand for plates has improved. There is an increased call for special grades of plates for high pressure vessels.

Reinforcing Bars

Efforts to eliminate the recent sharp concessions that were more common on rail steel bars and restore prices to regular quotations, are giving the market a firmer tone, although there have been no sales large enough to test the reestablished prices. Some producers, both of new billets and rail steel bars, have announced open market prices to distributors, and others are expected to do likewise.

Bethanized Wire Mill To Be Opened

FORMAL opening of its new mill, for the manufacture of Bethanized wire, will be held by Bethlehem Steel Co. before a convocation of agricultural, science and financial editors at its Cambria plant, Johnstown, Pa., April 16.

The opening was postponed from an earlier date because of the flood

conditions. A delegation of metallurgists who have participated in the development and a group of rural economics authorities will also attend the gathering.

The new mill unit is part of Bethlehem's \$30,000,000 program of improved facilities in making types of steel for consumers' goods. The Bethanizing process provides a new type of zinc-coated galvanized wire having a mirror-like chromium-type finish.

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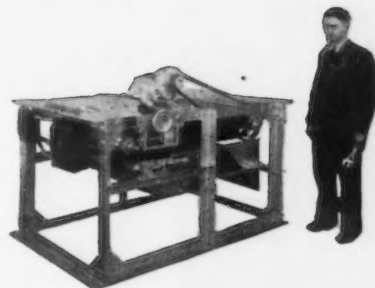
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HIGH STEARNS DUTY

MAGNETIC EQUIPMENT

Fabricated Steel

(CONTINUED FROM PAGE 80)

CENTRAL STATES

Detroit, 600 tons, building for Chrysler Motor Corp., to R. C. Mahon Co.

Detroit, 300 tons, building No. 23, Fisher Body Corp., to Jones & Laughlin Steel Corp.

Bay City, Mich., 105 tons, warehouse, to Flint Structural Steel Co.

Rock Island, Ill., 525 tons, Illinois State armory, to Bethlehem Steel Co.

Peoria, Ill., 200 tons, senior high school, to Mississippi Valley Structural Steel Co.

Chicago, 110 tons, soya bean building, to Wendnagle & Co.

State of Indiana, 300 tons, Jackson County bridge, to Pan-American Bridge Co.

Minneapolis, Minn., 300 tons, bridge, to Bethlehem Steel Co.

WESTERN STATES

El Paso County, Colo., 315 tons, highway bridge, to American Bridge Co.

Flathead County, Mont., 225 tons, bridge, to Clinton Bridge Works.

Los Angeles, 545 tons, pier shed, to Minneapolis-Moline Power Implement Co.

Yuba City, Cal., 410 tons, dredge, for Yuba Mfg. Co., to Moore Dry Dock Co.

Bremerton, Wash., 100 tons, hangar at

Puget Sound Navy Yard, to Isaacson Iron Works.

State of Oregon, 146 tons, bridge over Monument River, to Poole & McGonigle.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Lawrence, Mass., 150 tons, bridge.

Fort Fairfield-Presque Isle, Me., 110 tons, two State bridges.

Washington, 800 tons, Michigan Avenue bridge; bids April 22.

Dunmore, Pa., 400 tons, high school, bids rejected; new bids soon.

Monroe County, Pa., 220 tons, highway bridge; bids April 24.

Tuckahoe, N. J., 130 tons, bridge; bids in.

SOUTH AND SOUTHWEST

Pinal County, Ariz., 125 tons, State highway work; bids April 28.

Albuquerque, N. M., 840 tons, State highway bridge.

CENTRAL STATES

Dayton, Ohio, 600 tons, building for Dayton Power & Light Co.; bids in.

Coshocton, Ohio, 250 tons, building for Muskingum Fiber Products Corp.; bids, April 16.

Columbus, Ohio, 400 tons, apartment building; bids April 22.

Cuyahoga County, Ohio, 725 tons, State highway bridge.

Dearborn, Mich., 200 tons, power house addition, Ford Motor Co.

Detroit, 1400 tons, stamping plant for Chrysler Corp.

State of Michigan, 850 tons, grade separations.

Streator, Ill., 500 tons, warehouse for Owens-Illinois Glass Co.

State of Illinois, 1200 tons, highway bridges; bids, April 17.

Evanston, Ill., 100 tons, building for Field estate.

State of Illinois, 2000 tons, overhead crossings.

Chicago, tonnage not stated, Wieboldt department store.

State of South Dakota, 500 tons, bridges; bids, April 21.

State of North Dakota, 800 tons, bridges; bids, April 23.

State of Minnesota, 1500 tons, four highway bridges; bids, April 21.

State of Wisconsin, 600 tons, bridges; bids, April 17.

St. Louis, 950 tons, superstructure for municipal bridge approach; Mississippi Valley Structural Steel Co., low bidder.

Kansas City, Mo., 1500 tons, Fiftieth and Sixty-third Streets viaducts.

Chicago Great Western Railroad, 100 tons, three spans.

WESTERN STATES

Pueblo, Colo., 405 tons, State overpass and bridge; bids, April 23.

Oceanside, Cal., 605 tons, State bridge over Santa Margarita River; bids, April 30.

Oregon City, Ore., 245 tons, State undercrossing; bids, April 17.

Hichman Field, T. H., 2000 to 3000 tons, four double hangars; bids, April 28.

FABRICATED PLATES

AWARDS

Long Beach, Cal., 500 tons additional, two city tanks, to Western Pipe & Steel Co.

Sacramento, Cal., 100 tons, 40 pontoons for United States Engineers, to Pacific Coast Engineering Co. and Western Pipe & Steel Co.

NEW PROJECTS

Quincy, Mass., 250 tons, standpipe.

Cincinnati, 3000 to 3500 tons, 20 to 25 welded or riveted steel coal barges for Hatfield Campbell Creek Coal Co.

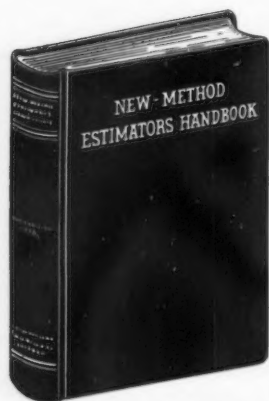
SHEET PILING

AWARDS

Denver, Colo., 200 tons additional, Bureau of Reclamation, to Inland Steel Co.

Sivyer Steel Casting Co., Milwaukee, reports 1935 net income at \$36,960, equal to 46c. a share on the common stock. This compares with \$2,287, or 3c. a share, in the preceding year.

Acme Steel Co., Chicago, and subsidiaries, report for the year ended Dec. 31, 1935, income of \$1,760,965. Profit was equal to \$5.37 a share based on 328,108 shares at the year end. In the like 1934 period consolidated net income was \$1,020,533, equal to \$3.11 a share.



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CHICAGO

PHILADELPHIA



... *Post-flood mill operations advance district rate to 45 per cent.*

... *Harrisburg melter's activity highest since 1929.*

... *Current activity predicated on first quarter contracts; mills seek replacement tonnages.*

PHILADELPHIA, April 14.—Mill operators in this area are less jubilant than normally would be expected in view of the current buoyancy of the district's individual and average operating rates. The operators don't deny that schedules are overloaded with low-price first quarter tonnages which unofficially must be shipped out by the month's end. However, there is a suspicion that orders now being rolled in such a hurry are really borrowed from what normally would be current or early May business, and such a condition in the past has been followed by a period of comparative dullness. Naturally, the listless manner in which new business is currently developing lends weight to this opinion.

The Harrisburg mill has placed a fifth furnace in operation. Only one small furnace remains inoperative, and the mill's activity is the highest since 1929. Bethlehem's Steelton plant has three furnaces on and will add three more before the end of the week, provided flood-damaged rolling-mill motors show no weaknesses heretofore undiscovered. The main Bethlehem plant is running at a high rate and Sparrows Point operations are near capacity. The Pencoyd mill has taken one unit off but expects to be back to four by next week. These shifts in individual operations have advanced the district rate two points to 45 per cent of capacity.

Very little second quarter business under newly-established extra lists has come into the market. Consequently the firmness of the new quotations is for the most part untested.

Pig Iron

Sellers are mostly engaged in taking care of requisitions on old orders rather than writing up new business. Foundry operations in this area are most encouraging, but, unfortunately, the average melter still has considerable iron due him on outstanding orders or has stock piles in his yard which must be melted before additional purchases will be considered. For these reasons, what new business there is consists mostly of fill-in lots for quick shipments or occasional carlots to small melters.

Consumers are currently making no effort to secure shaded quotations, probably because the united front of all sellers minimizes the likelihood of success.

Warehouse Business

Average turnover for April is about on a par with March volume. Principal firms are looking forward with considerable confidence to a continuance of current demand over the next two months. Prices are firm and unchanged, and buying is spread throughout all classes of steel. Jobbers and warehouse operators are generally pleased with the new extra rates mills have set up.

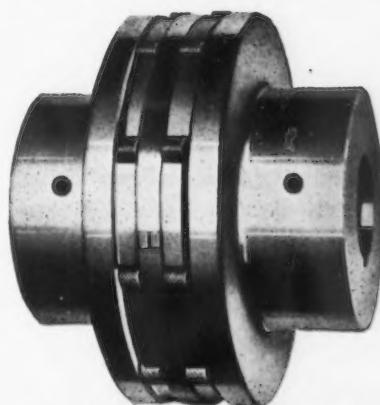
Sheets and Strip

Larger district consumers, jobbers and warehouses are covered against estimated requirements up to the middle of May. A good percentage of this business was taken at low prices, therefore the buyers are more concerned with disposing of their shipments than buying replacement tonnages at new price levels. A little day-to-day carload business is drifting in, but second quarter demand is generally much below actual consumption. Prices have had no real test. However, all sellers insist that new extra lists will be applied with no exceptions.

Bars, Plates and Shapes

The Norfolk & Western has delayed the purchase of 2500 tons of low-alloy, high-tensile steel for cars. This business will probably be placed late this week, and, pos-

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sibly, regular carbon steel will be substituted for the original high-tensile specifications. Also, the Baltimore & Ohio railroad is expected to enter orders for a sizable tonnage of tie plates and spikes sometime during the week. Local shipyards are bidding on two Matson line boats, which will require about 8000 tons of steel, and one War Department dredge. These tenders are all due May 4. Structural steel awards during the week amounted to only 310 tons, new projects add up to only about 500 tons. The demand for reinforcing and merchant bars continues to be exceptionally light.

Imports

The following iron and steel imports were received here last week: 10,500 tons of manganese ore from the Gold Coast; 250 tons of ferromanganese from the Netherlands, and 203 tons of sponge iron, 86 tons of steel tubes, 38 tons of steel bars, 41 tons of C D S wire, 14 tons of steel billets and 5 tons of steel forgings from Sweden.

J. & L. to Appeal Labor Board Decision

Jones & Laughlin Steel Corp. will appeal the recent finding of the National Labor Relations Board, regardless of future action of the board. The latter recently ordered the steel company to reinstate 10 employees whom the company dismissed at its Aliquippa, Pa., plant because of inefficiency.



... Sheet demand at 85 per cent of capacity.

o o

... Warehouse business much better.

CINCINNATI, April 14.—Short term ordering to cover sheet steel needs is in good volume as consumers seek to supplement inventories. As a result demand is at 85 per cent of capacity and the leading interest is taking new business at a rate slightly better than 90 per cent of capacity. Bookings represent wide usages with automobile and household equipment manufacturers in the lead.

Rolling schedules are averaging slightly better than demand as mills seek to reduce backlogs built during the latter part of the first quarter. Prices are steady and consumers are accepting new contracts without noticeable pressure on quotations.

Warehouse business has advanced sharply, this month, one interest indicating that demand is higher than at any time since 1930. While jobbers' ordering is largely industrial, constructional demand is beginning to expand slowly.

Furnace interests report the pig iron market sluggish. Many melt-

ers are carrying fairly large inventories, although near requirements of others are sustaining the market sales at an average of about 1100 tons a week. A few small inquiries also indicate likelihood of further ordering in the immediate future. Foundry operations have expanded further, the average melt being slightly over 70 per cent. Improvement in machine tool business and increased stove requirements are most noticeable, although jobbing foundries are receiving new demand.



... Bridge and highway work active.

o o

... Second quarter pig iron buying improved.

ST. LOUIS, April 14.—Mississippi Valley Structural Steel Co. is low bidder on 950 tons of structural steel for the superstructure of an approach to the St. Louis Municipal Bridge, at \$77.70 a ton. Low bids for 660 tons of 100-lb. rails follow: new, Carnegie-Illinois Steel Corp., \$26,140; used, Hyman-Michaels Co., \$17,160. Carnegie-Illinois also is low bidder on 1000 pairs of angle bars, 27,000 standard tie plates, as well as on track bolts, track spikes, etc., and Ramapo-Ajax Corp. is low on special track work.

Illinois will open bids Friday on highway work requiring 1200 tons of structural steel and 400 to 500 tons of reinforcing bars. Laclede Steel Co. has been awarded 200 tons of reinforcing bars for a building for the St. Louis Dairy Co. and 300 to 400 tons for a number of small highway jobs in Missouri and Illinois which had been awarded to general contractors some time ago.

Such seasonable items as fencing and roofing are moving well. Prices on the latter are now quite firm.

Shipments of pig iron continue at a steady rate. While no sales of large tonnages are reported, melters are buying sufficient quantities to cover their second-quarter requirements. The consumption in the Belleville stove manufacturing district was reported on the increase, and jobbing foundries also are melting more.

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RAILROAD BUYING

Louisiana & Arkansas has ordered five 2-8-2 type locomotives from Lima Locomotive Works.

New York Central has placed orders for seven Diesel-electric switch engines with Electro-Motive Corp.

New York, New Haven & Hartford has ordered 50 light-weight passenger cars from Pullman Standard Car Mfg. Co.

Atchison, Topeka & Santa Fe has contracted with Edward G. Budd Mfg. Co. for an eight-car streamlined, stainless steel train for delivery in six months.

Missouri Pacific is in the market for 2000 freight cars.

Erie has placed 500 box cars with American Car & Foundry Co., 200 automobile cars with Magor Car Corp., and 100 automobile cars with Greenville Steel Car Co.

RAILS AND TRACK SUPPLIES

Chicago & Eastern Illinois has ordered 6000 tons of rails.

Green Bay & Western has placed 2000 tons of 90-lb. relaying rails with Carnegie-Illinois Steel Corp. in addition to 1400 tons recently reported.

San Francisco has bought 257 tons of 129-lb. girder rails for city from Bethlehem Steel Co.

Seaboard Air Line has ordered 5000 tons of 100-lb. rails from Tennessee Coal, Iron & Railroad Co.

Gulf, Mobile & Northern has ordered 1439 tons of 90-lb. rails and 255 tons of track accessories from Tennessee Coal, Iron & Railroad Co.

Chicago, Rock Island & Pacific has ordered 14,000 tons of rails in addition to 26,000 tons reported last week, dividing the purchase between Carnegie-Illinois Steel Corp., Inland Steel Co. and Colorado Fuel & Iron Co.

Baltimore & Ohio has ordered 15,600 tons of rails from Carnegie-Illinois Steel Corp., 8400 tons from Bethlehem Steel Corp., and 1000 tons from Inland Steel Co.

PIPE LINES

Empire Pipe Line Co., Bartlesville, Okla., plans about 10,000 ft. of 6-in. welded steel pipe in Thirtieth Street, Oklahoma City, for crude oil transmission. Cost over \$40,000. E. D. Hill, Insurance Building, Oklahoma City, is consulting engineer.

William T. Lively, Charleston, W. Va., will have plans and surveys made by Charles E. Krebs, Inc., Charleston, engineer, for new welded steel pipe line for natural gas service at Pineville and Middleboro, Ky., for which franchises have been secured, recently noted in these columns. Project will comprise main 6 or 8-in. line from natural gas field at French Lick, Knox County, to first noted place, with extension through Log Mountain district to Middlesboro, about 17 miles in all. Steel pipe line for gathering

system, about 26 miles, will be installed in natural gas field territory, while steel pipe distributing lines, about 50 miles in all, will be installed in two municipalities noted. Entire project will cost about \$500,000. Russell Cameron, Charleston, engineer, is also interested in enterprise.

Northern Natural Gas Co., Omaha, Neb., has let installation contract to Truman N. Smith Construction Co., El Dorado, Kan., for new 20-in. welded steel pipe line from natural gas fields at Hugoton, Kan., to point near Mullinville, Kan., about 100 miles, where connection will be made with present main pipe line for natural gas supply for municipalities in Nebraska and Minnesota. Award for main electrically welded steel pipe was placed recently

with A. O. Smith Corp., Milwaukee. Cost over \$1,000,000.

Kaplan, La., has let contract to C. J. Montgomery, Kaplan, for steel pipe system for natural gas, including main line for connection with trunk transmission line of United Gas Co., near Abbeville, La. Cost about \$65,000. Bond issue has been voted.

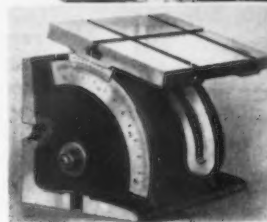
Phillips Petroleum Co., Bartlesville, Okla., plans two new welded steel pipe lines in Lindsay and Twenty-eighth Street, Oklahoma City, Okla., 6-in. for crude oil transmission, and 10-in. for natural gas transmission. Cost close to \$50,000. A. H. Riney, Bartlesville, is company engineer.

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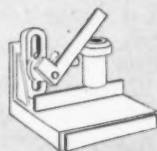


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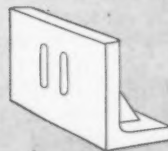
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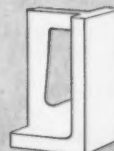
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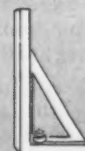
SINE BARS AND FIXTURES



SLOTTED ANGLE IRONS



RIGHT ANGLE IRONS



MEASURING IRONS



... Demand for heavy steel products is well sustained.

o o o

... Sheets and strip steel quiet, with tin plate fairly active.

o o o

... Railroad purchases and releases continue to be an important market factor.

NEW YORK, April 14.—While sellers of the lighter steel products have found business rather quiet in the first half of the month, demand for bars, plates, shapes and railroad materials continues to expand gradually. In most instances the tonnages being placed are not large, but the aggregate is satisfactory.

Large construction projects are temporarily not outstanding in this territory, but building plans filed in the first three months of the year in New York are more than double those reported in the first quarter of 1935. Small apartment developments are numerous and much commercial remodeling is being undertaken. A little plant expansion work is reported. An FHA slum-clearance project on the Harlem River will be out for bids in the near future and the Harris Structural Steel Co. has taken 1300 tons of structural steel for an industrial home for girls in the Bronx.

The Baltimore & Ohio has placed 25,000 tons of rails, divided among the Carnegie-Illinois Steel Corp., the Bethlehem Steel Co. and the Inland Steel Co. The Delaware, Lackawanna & Western and the Lehigh Valley continue to release tonnage for their car building and repair activities. For the construction of 50 passenger coaches for the New Haven, low-alloy, high-tensile steel has been specified and the tonnage placed with the Carnegie-Illinois company.

The price structure is without feature as little test of the new quantity differential system on bars, sheets and strip steel is being offered. Consumers of plates are

pressing for a similar set-up on that product. Uncertainty continues regarding the application of both quantity deductions and the usual allowance for re-export in the sale of sheets to barrel and drum makers. If both deductions were allowed, the concession from the base price might amount to as much as \$8 a ton.

It is reported that a mill for the production of cold-finished steel bars will soon be undertaken at Newark, N. J.

Pig Iron

Preparations by Mystic stack at Everett, Mass., and Troy, N. Y., furnace to resume operations are in progress. Output of these plants will increase competition in an already surfeited Eastern district. Sales continue in light volume, and are a fair indicator of the rate of consumption, although shipments partially reveal the heavier accumulation of orders secured at the quarter's opening. Foreign brands appear to be selling in larger volume because of price concessions, and buyers are occasionally pressing for quantity discounts or the waiving of silicon differentials on purchases from domestic sellers. Some diversion of customary domestic business into foreign channels has accordingly taken place. This factor, combined with a pending expansion in producing capacity, does not augur too well for forward prospects. The New York silicosis insurance law, while not uppermost in the market picture at present, is nevertheless proving to be a burden, and impairment to business is seen in this situation also. A bright spot

in the market was the purchase of 1000 tons by the largest manufacturer of electrical equipment.

Reinforcing Steel

Several reinforcing bar awards were reported last week, but all were small and the total tonnage was unimpressive. A fair amount of work is in sight for the next few weeks, but no large jobs are outstanding. Prices generally are reported firm and no confirmation of price cutting has recently been offered.



Procurement Office of the Treasury has awarded 1172 ft. of 6-in. for Billerica, Mass., to Warren Foundry & Pipe Co.

Providence, R. I., closed bids April 13 on 800 tons of 6, 8 and 12-in.

Procurement Office of the Treasury has awarded 119 tons of 8-in. and 281 tons of 12-in. to Warren Foundry & Pipe Corp., for Boston.

Burrillville (Harrisville), R. I., fire district, will soon announce plans for a waterworks system. Jenks & Ballou, 2600 New Industrial Trust Building, Providence, R. I., are engineers.

Warren Foundry & Pipe Corp. was low bidder on 8900 ft. of 6 to 12-in. required by Athol, Mass.

Portland, Me., has awarded 2600 ft. of 8-in. to R. D. Wood Co. at \$1.03 per ft.

Waterbury, Conn., has placed 200 tons of 8-in. with Donaldson Iron Co.

Harwich, Mass., closes bids April 23 for about 16 miles for water system, various sizes; also for elevated steel tank and tower, pumping machinery and accessories, valves and other waterworks equipment. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

Cookeville, Tenn., plans pipe lines for water system. Bond issue of \$18,000 has been authorized for this and other waterworks installation.

Lincoln, Neb., plans new 8-in. line for main water supply from point near Lakeview to Raymond Corner district; also new 50,000-gal. elevated steel tank and tower. Cost about \$33,000. D. L. Erickson is city engineer.

Springboro, Pa., asks bids until April 24 for pipe for water system; also for elevated steel tank and tower, electric-operated pumping machinery and other waterworks equipment. Karl A. Miller, 548 Baldwin Street, Meadville, Pa., is borough engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until April 22 for 3600 ft. of water pipe (Schedule 3137).

Ashley, Ind., will soon take bids for pipe for water system; also for pumping machinery and other waterworks installation. Cost about \$95,000. Lennox & Matthews, Architects' & Builders' Building, Indianapolis, are consulting engineers.

Caliente, Nev., closes bids April 24 for pipe for water system, including replacements and extensions. Cost about \$50,000.

Financing has been arranged through Federal aid. A. A. Barr, Caliente, is engineer.

Lexington, Ky., plans pipe lines for extensions and improvements in water system, including main trunk line to Kentucky River for new water source; also storage reservoirs, water-treatment plant, pumping station and other waterworks installation. Howard K. Bell, Lexington, is consulting engineer.

Maryville, Mo., plans about 6500 ft. of 2, 4 and 6-in. for replacements in present water system. Financing is being arranged.

Skowhegan, Me., plans pipe lines for water system; also new steel stand-pipe, filtration plant, reservoir and other waterworks installation. Cost about \$80,000.

San Bernardino County Waterworks District No. 14, San Bernardino, Cal., now being organized, care of F. J. Atkinson, deputy clerk, San Bernardino County Board of Supervisors, San Bernardino, plans pipe lines for water system; also other waterworks installation, including pumping machinery. Cost about \$50,000.

Alamo, Tenn., plans 6-in. and smaller for water system; also new 100,000-gal. elevated steel tank and tower, pumping equipment and other waterworks installation. Joseph G. Hubbard, Alamo, is engineer.

Rapid City, S. D., has called special election April 26 to approve bonds for \$90,000 for pipe lines for water system, pumping station and other waterworks installation. H. W. Zolpher is city engineer.

Pasadena, Cal., has placed 498 tons of 6 and 8-in. with National Cast Iron Pipe Co.



... Bids taken on Birmingham water system.

... Rail orders are placed.

BIRMINGHAM, April 14.—Bids were opened April 10 by the Alabama WPA procurement officer on approximately 121,700 ft. of steel pipe, ranging from 42 in. to 60 in., for Birmingham's industrial water system. Ingalls Iron Works Co. and Chicago Bridge Iron Works Co., bidding jointly, were low, with a bid of \$1,236,843. The bids are to be referred to Washington before award of contract is made.

It was announced last week that the Seaboard Air Line had placed an order with the Tennessee Coal, Iron & Railroad Co. for 5000 tons of 100-lb. rail; the Gulf, Mobile & Northern, for 1439 tons of 90-lb. rail and 255 tons of track accessories.

Ingalls Iron Works has booked 1000 tons of structural steel for the new paper mill of the Crossett Lumber Co., Crossett, Ark., and 200 tons for a warehouse of the Western Sugar Refining Co., Cairo, Ill.

Nashville Bridge Co. is shipping 400 tons of transmission towers to Texas from its Bessemer, Ala., plant, while Virginia Bridge Co. is to furnish about 800 tons for a coliseum at Fort Worth, Tex.

Buying of sheets and wire products continues at a satisfactory rate and the outlook for heavier lines is better.

The pipe situation in April will be about the same as in March. Bookings are scattered but there is an increase in releases on old orders, some of which have been pending since November.



... British production unaffected by Easter holidays.

... Increased prices are expected soon.

LONDON, April 14 (By Cable).—Production was affected only slightly by the Easter holidays, most works maintaining operations in order to make up delivery arrears existing in nearly all departments.

Famine conditions continue in foundry iron trade. An additional furnace is restarting in May but several weeks will elapse before the output will be available to the open market. An early advance in hematite prices is predicted.

Production of semi-finished steel has reached capacity but is still below demand and some makers have temporarily closed books. Heavy demand is being made for ship building steel and prospects are further enhanced by large warship orders. Other consumers of heavy steel, notably the building and engineering trades are specifying heavily. Early price advances are expected. Export business, especially in plates and sections is better but irregular.

Home demand for tin plate is quieter probably owing to the holidays, but good export bookings and inquiries are in evidence.

Continental iron and steel markets are quiet due to the holidays and the international political situation but improvement is expected soon. Meanwhile works are well booked.

FINISHES

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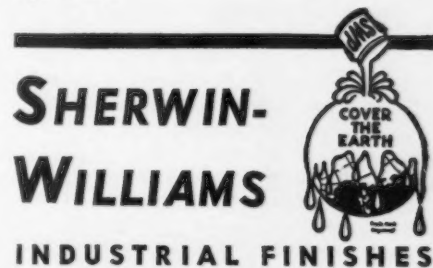


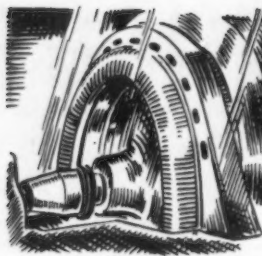
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NON FERROUS

... **Copper advances \$5 a ton with heavy sales reported.**

o o o

... **Lead steady, but zinc sales increase slightly.**

o o o

... **Easter holidays interrupt business in tin.**

NEW YORK, April 14.—The new price for electrolytic copper, effective this morning, is 9.50c. a lb., Connecticut Valley. When, toward the close of last week, sellers indicated they were uniformly agreed that the price should be made 9.50c. in place of the two sets of prices previously prevailing, buyers began covering heavily so as to obtain the benefit of the 9.25c. quotation as long as it should last. This morning, however, the lower priced metal appeared exhausted, and sales reported at 9.50c. indicate that the latest price has taken hold. From April 9 through the close of last week domestic sales totaled 63,054 tons. The corresponding total for the month was 84,899 tons. Orders taken yesterday have not yet been definitely determined, but are estimated at close to 40,000 tons. Not since last August, when 124,604 tons was placed under contract, has there occurred a heavier buying period. Although business from now on probably will not expand April sales much above their present level, it is likely that the month's total will exceed that indicated for last August. In accord with the higher market for electrolytic, Lake copper has been advanced to 9.62½c. a lb., delivered New York. Export metal, at 9.30c., usual European base ports, is higher than it has been for a considerable period.

Lead

With interest in non-ferrous metals centered largely in copper, lead and zinc passed through a comparatively quiet period last week. No increase in demand for lead was reported, and sales therefore are thought to have amounted to about 4000 tons, possibly less. Battery and paint interests were steady buyers, and inquiry from other representative sources was re-

ported. Daily sales appear at present to be averaging one-third April metal as against two-thirds May. The market, while on a more quiet basis than heretofore, is steady, and

prices are firm and unchanged at 4.60c. a lb. St. Joseph Lead Co. has been obtaining a \$1 a ton premium on orders taken in the Eastern district.

Zinc

A moderately better volume of demand for zinc developed last week, and Prime Western sales came to 3362 tons, as against but 1432 tons in the preceding period. Shipments totaled about 4100 tons, resulting in a further slight decline in unfilled orders. Activity in copper may partially have stimulated interest among zinc buyers, although there is no logical connection between the two markets. The price is very firm at 4.90c. a lb., and statistically the market remains sound. Sellers have pointed out that the increase in stocks during March occurred almost entirely among high-grade brands and that therefore regular grades of zinc were unaffected. Weakening of the foreign price, as attempts to revive the European cartel met with difficulties, is not a favorable augury at

The Week's Prices. Cents Per Pound for Early Delivery

	April 8	April 9	April 10	April 11	April 13	April 14
Electrolytic copper, Conn.*.....	9.25	9.25	9.25	9.25	9.25	9.50
Lake copper, N. Y.....	9.37½	9.37½	9.37½	9.37½	9.37½	9.62½
Straits tin, Spot, New York....	47.00	46.87½	.....	.....	47.12½	47.12½
Zinc, East St. Louis.....	4.90	4.90	4.90	4.90	4.90	4.90
Zinc, New York†.....	5.27½	5.27½	5.27½	5.27½	5.27½	5.27½
Lead, St. Louis.....	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York.....	4.60	4.60	4.60	4.60	4.60	4.60

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb., delivered.
Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 13.50c. a lb., New York.
Quicksilver, \$77.00 to \$79.00 per flask.
Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig....	48.25c. to 49.25c.
Tin, bar.....	50.25c. to 51.25c.
Copper, Lake.....	10.25c. to 11.25c.
Copper, electrolytic.....	10.25c. to 11.25c.
Copper, castings.....	10.00c. to 11.00c.
*Copper sheets, hot-rolled.....	16.75c.
*High brass sheets.....	14.87½c.
*Seamless brass tubes.....	17.37½c.
*Seamless copper tubes.....	17.50c.
*Brass rods.....	13.12½c.
Zinc, slabs.....	5.75c. to 6.75c.
Zinc, sheets (No. 9), and over.....	10.25c.
Lead, American pig.....	5.10c. to 6.10c.
Lead, bar.....	6.10c. to 7.10c.
Lead, Sheets, cut.....	8.25c.
Antimony, Asiatic.....	14.00c. to 15.00c.
Alum., virgin, 99 per cent, pus.....	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.....	18.50c. to 20.00c.
Solder, ½ and ½.....	29.50c. to 30.50c.
Babbitt metal, commercial grades.....	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	51.00c.
Tin, bar.....	53.00c.

Copper, Lake.....	10.25c. to 10.50c.
Copper, electrolytic.....	10.25c. to 10.50c.
Copper, castings.....	10.00c. to 10.25c.
Zinc, slabs.....	6.50c. to 6.75c.
Lead, American pig.....	5.20c. to 6.50c.
Lead, bar.....	8.50c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	19.00c.
Babbitt metal, high grade.....	55.00c.
Solder, ½ and ½.....	27.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	7.25c.	8.00c.
Copper, hvy. and wire.....	7.12½c.	7.62½c.
Copper, light and bottoms.....	6.12½c.	6.62½c.
Brass, heavy.....	4.00c.	4.62½c.
Brass, light.....	3.25c.	4.00c.
Hvy. machine composition.....	6.00c.	6.50c.
No. 1 yel. brass turnings.....	5.12½c.	5.62½c.
No. 1 red brass or Lead, heavy.....	3.50c.	3.87½c.
compos. turnings.....	5.62½c.	6.12½c.
Sheet aluminum.....	13.25c.	14.75c.
Zinc.....	2.50c.	2.87½c.
Cast aluminum.....	12.12½c.	13.25c.

present, but subsequent action by principal foreign interests may end more satisfactorily. Domestic ore prices are again unchanged this week at \$31 and \$32 a ton.

Tin

Easter interruptions deprived the tin market of an opportunity to carry on business as usual last week. On April 9, however, a good day's trading was indicated as tin plate producers and other interests covered ahead into July and August. Sales probably amounted to between 300 and 400 tons. The market did not officially open again until this morning, although yesterday a nominal domestic price of 47.12½c. was posted. Today's price is indicated to be the same, but selling conditions are reported very quiet. In London this morning standard spot metal opened at £210 10s., and futures were £204. The Eastern price was £208 17s. 6d.



... Pig iron sales still lagging.

o o

... New England steel operations at high rate.

BOSTON, April 14.—Melters are still in no hurry to anticipate pig iron requirements, despite the improvement in general New England industrial activity. The American Tube & Stamping Co., Bridgeport, Conn., is operating four furnaces, while at Phillipsdale, R. I., three furnaces are melting. Most of the other key industries are booking orders well in excess of a year ago. Plans are going ahead to light the Mystic Iron Works furnace around May 1. Coke conveying equipment, from the New England Coal & Coke Co.'s ovens to the furnace, is being installed which will eliminate storing of fuel. Foundry melt is increasing, but slowly. Outlook for casting orders later in the year are exceedingly bright.

Demand for cast iron pipe has picked up noticeably, and indications are a considerable tonnage of steel will be fabricated for bridges lost in recent floods during the next month or so. Warehouse shipments are picking up.



... Awards of 3500 tons
—4900 tons in new projects.

AWARDS

Worcester, Mass., 100 tons, parcel post building, to Concrete Steel Co.

Peoria, Ill., 230 tons, public school building, to Concrete Engineering Co.

Topeka, Kan., 200 tons, dam, to Concrete Steel Co.

Chicago, 300 tons, Sanitary District, section No. 15, to an unnamed bidder.

St. Louis, 200 tons, building for St. Louis Dairy Co., to Laclede Steel Co.

St. Louis, 300 to 400 tons, highway projects, to Laclede Steel Co.

Olympia, Wash., 400 tons, State building, to Truscon Steel Co.

San Francisco, 212 tons, shop building at George Washington high school, to Bethlehem Steel Co.

Monterey County, Cal., 176 tons, State bridge south of San Ardo, to Concrete Engineering Co.

San Francisco, 100 tons, apartment house on Broadway and Buchanan Street; foreign steel is reported to have been purchased.

San Diego, Cal., 245 tons, strengthening of Hodges reservoir dam, to Fenton Material Co.

Sacramento, Cal., 490 tons, public works office building, to Soule Steel Co.

Los Angeles, 100 tons, Narbone high school, to an unnamed bidder.

State of Montana, 112 tons, bridges in three counties, to unnamed bidders.

Missoula, Mont., 115 tons, State overpass on Orange Street, to an unnamed bidder.

Denver, 145 tons, material for Bureau of Reclamation for All-American Canal, to Soule Steel Co.

NEW REINFORCING BAR PROJECTS

Washington, 250 tons, Michigan Avenue bridge; bids, April 22.

Bedford, Ohio, 175 tons, grade crossing elimination; bids, April 17.

State of Indiana, 1000 tons; bids opened.

Chicago, 500 tons, Jane Addams housing project.

Chicago, 1000 tons, Sanitary District sewer No. 2 in upper Des Plaines.

Detroit, tonnage not stated, contemplated addition to Norge Refrigerator Co.

State of Illinois, 400 to 500 tons, highway projects; bids, April 17.

Winslow, Ariz., 170 tons, State subway; bids, May 1.

Pueblo, Colo., 145 tons, State overpass and bridge; bids, April 23.

Oakland, Cal., 420 tons, State undercrossing at San Leandro Street; bids, April 29.

Sacramento, Cal., 280 tons, reservoir at city filtration plant; bids, April 23.

Oceanside, Cal., 100 tons, State bridge over Santa Margarita River; bids, April 30.

Los Angeles, 400 tons reinforced wire mesh, for Metropolitan Water District; bids opened.

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● Correspondence if interesting will develop personal interviews and will be held in strict confidence. The members of the organization placing this advertisement are fully informed about its publication and the reader is assured that this opportunity is not being advertised by his present employers.

ADDRESS BOX R-427

Care The Iron Age, 239 W. 39th Street, New York N. Y.



... Scrap composite rises 5c. to \$14.63; compared with \$10.67 a year ago.

o o o

... Chicago prices firmer, and all other districts maintain strength.

o o o

... Dealer deliveries improve.

APRIL 14.—In the absence of new sales, markets all over the country are practically unchanged from last week. Brokers are attempting to satisfy mill demands that existing orders be shipped out at a faster pace, but these demands have created no particular hardship inasmuch as scrap collection and preparation have been perceptibly accelerated. A moderate reaction to last week's weakness at Chicago has advanced the scrap composite 5c. to \$14.63, which level is considerably above the year's average to date and well above the 1935 average.

What trend mill operations will take over the next fortnight will react quickly in scrap prices. Both buyers and sellers suspect that the present activity is artificially high to take care of rush orders and may be followed by a moderate decline. Along the Atlantic Coast, brokers are collecting steadily against export commitments. Deliveries are going forward on schedule, but sizable quantities are yet due foreign melters.

Pittsburgh

With no recent sales and with the weather opening up, the tone of the Pittsburgh market is much easier than last week. Practically all large consumers are out of the market for the time being. While the \$16 price for heavy melting is unchanged, it will probably be tested in the near future. Dealers who secured the recent 1600-ton heavy melting steel order are able this week to cover better, inasmuch as scrap is flowing more freely into this district and some distress material is available.

Chicago

The market appears to be strengthening slightly. However, an absence of consumer buying blurs the picture.

Heavy melting steel is quotable with a 25c. spread and \$14.50 a ton the top limit. The flow of scrap is not so heavy, though industrial accumulations are still in sufficient volume to hold price advances in check. Hydraulic bundles are coming here by rail from Detroit, and it is reported that additional quantities will arrive by boat as soon as ice is cleared in the upper Lakes. It is also reported that eight or nine boatloads of car wheels and cast grades are scheduled to come to Chicago.

Cleveland

Regulation of shipments has resulted in an easier price situation in the Youngstown district. The market locally is steady at recent price levels. Scrap is coming out only in moderate volume. Consumers still have adequate supplies either in stock or due on contracts, and activity is confined to brokers' purchases to fill outstanding orders. No. 1 steel is bringing \$15.25 from brokers for Youngstown delivery or 50c. a ton lower than the recent peak. No. 2 is bringing \$14.25 to \$14.50, as compared with a recent top price of \$15. Dealers are paying \$14.75 to \$15 for No. 1 steel for Cleveland delivery. Scrap from Michigan and Indiana is going largely to the Pittsburgh district, although a few water shipment cargoes from Detroit have come to Cleveland.

The proposed dismantling of the two Josephine furnaces, Scottdale, Pa., by the Republic Steel Corp., will bring several thousand tons of scrap on the market if these furnaces are sold.

Philadelphia

The week has been devoid of new business of any consequence. The Harrisburg consumer is releasing shipments on all contracts, and all other mills are urging accelerated deliveries on all tonnages due them. The market's key grade, No. 1 steel, remains quotable at \$13.50 to \$14, and the general prophecy is that the next sale will either be within this range or only slightly over the upper limit. Indica-

tive of sustained strength is the willingness of the district's largest direct buyer to pay \$13.50 for dealer shipments. Although heavy mill operations in this area have been conducive to scrap buoyancy, the constant purchases of No. 1 at \$13 for export is the real supporting factor. Dealers know that brokers have sizable foreign commitments which can be profitably liquidated even though dock accumulations average \$13 a ton or a shade more.

Boston

Exporters have lifted prices for Nos. 1 and 2 steel another 25c a ton, thereby establishing a new top level for the current movement. Three exporters are competing actively for scrap. No boats are loading here at the moment, but one is expected to arrive this week, and, possibly, a second. Two steamers are scheduled to arrive next week. Total tonnage involved for these four boats will approximate 12,000 tons, most of which is consigned to Great Britain.

New York

Brokers are loading barges and boats with No. 1, No. 2 and cast grades for Italian, English and Japanese ports. Shipments to Italy are about cleared up, but there remains considerable undelivered tonnage for both England and Japan. All prices are firm and unchanged, and dealer deliveries are fairly liberal. There is a strong demand here for the delivery of important grades into eastern Pennsylvania.

Detroit

Prices here have weakened somewhat due to a tremendous increase in supply as some auto and parts plants have advanced operations to three shifts and a seven-day week. Local steel mills are buying heavily at present prices in anticipation of new open-hearth capacity in the early fall. Prices are expected to regain their strength as the ingot rate in other parts of the country rises.

St. Louis

Steel mills here have bought sparingly during the past fortnight. However, they are busy, and dealers believe they will reenter the market within the next ten days. Dealers' offerings are getting lighter, and better prices are anticipated. No. 2 steel is 25c. a ton lower. The only railroad list, the Louisville & Nashville, offers 8800 tons, of which very little is expected to be brought into this market.

Buffalo

It is reported that stove plate and No. 1 cupola cast have been sold at \$11.50 and \$12.50 respectively. The principal scrap consumer continues to offer \$13.50 for No. 1 steel, but the tonnage receipts are small. The market is firm and steady with heavy tonnages being consumed because of high open-hearth operations. Although open weather is bringing out supplies more freely, deliveries are not conspicuously heavy. No Lake scrap is expected for at least a month. Buying of more No. 1 is expected soon at \$14.

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 hvy. mtng. steel	\$15.50 to \$16.00
No. 2 hvy. mtng. steel	14.00 to 14.50
No. 2 RR. wrought.	15.50 to 16.00
Scrap rails	15.75 to 16.25
Rails, 3 ft. and under	16.50 to 17.00
Comp. sheet steel	15.50 to 16.00
Hand bundled sheets	14.00 to 14.50
Hvy. steel axle tngs.	13.50 to 14.00
Machine shop tngs.	10.50 to 11.00
Short shov. tngs.	10.50 to 11.00
Mixed bor. tngs.	8.25 to 9.25
Cast iron borings.	10.50 to 11.00
Cast iron carwheels.	14.00 to 14.50
Hvy. breakable cast.	13.00 to 13.50
No. 1 cast	15.00 to 15.50
RR. knuckles & couplers	17.25 to 17.75
Rail, coil & leaf springs	17.25 to 17.75
Roller steel wheels.	17.25 to 17.75
Low phos. billet crops	18.00 to 18.50
Low phos. sh. bar.	17.50 to 18.00
Low phos. punchings	17.00 to 17.50
Low phos. plate scrap	17.00 to 17.50
Steel car axles	16.00 to 16.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 hvy. mtng. steel	\$14.50 to \$15.00
No. 2 hvy. mtng. steel	13.50 to 14.00
Comp. sheet steel	13.50 to 14.00
Light bund. stamp'gs	10.00 to 10.50
Drop forge flashings	13.00 to 13.50
Machine shop turn.	8.50 to 9.00
Short shov. turn.	8.75 to 9.25
No. 1 busheling	13.50 to 14.00
Steel axle turnings	13.00 to 13.50
Low phos. billet crops	17.50 to 18.00
Cast iron borings	9.00 to 9.50
Mixed bor. & turn.	9.00 to 9.50
No. 2 busheling	9.00 to 9.50
No. 1 cast	15.00 to 15.50
Railroad grate bars	8.00 to 8.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.50 to 18.00
Rails for rolling	17.00 to 17.50
Railroad malleable	17.75 to 18.50
Cast iron carwheels	15.00

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 hvy. mtng. steel	\$13.50 to \$14.00
No. 2 hvy. mtng. steel	12.50 to 13.00
Hydraulic bund., new	13.00 to 13.50
Hydraulic bund., old	10.50 to 11.00
Steel rails for rolling	14.50 to 15.00
Cast iron carwheels	14.50 to 15.00
Hvy. breakable cast.	13.50 to 14.00
No. 1 cast	14.00 to 14.50
Stove pl. (steel wks.)	11.00 to 11.50
Railroad malleable	16.50 to 17.00
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace	6.25
Cast borings	6.00
Heavy axle turnings	10.25 to 11.75
No. 1 low phos. hvy.	17.00 to 17.50
Couplers & knuckles	17.00 to 17.50
Roller steel wheels	17.00 to 17.50
Steel axles	16.50 to 17.00
Shafting	19.00 to 19.50
No. 1 RR. wrought.	14.00 to 14.50
Spec. iron & steel pipe	12.00 to 12.50
Bundled sheets	11.00 to 11.50
No. 1 forge fire	12.00 to 12.50
Cast borings (chem.)	10.50 to 13.00

CHICAGO

Delivered Chicago district consumers:	
	Per Gross Ton
Hvy. mtng. steel	\$14.25 to \$14.50
Auto. hvy. mtng. steel	12.00 to 12.50
Shoveling steel	14.00

Iron and Steel Scrap Prices

Hydraul. comp. sheets	\$13.25 to \$13.75
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.00 to 13.50
Roller carwheels	15.50 to 16.00
Railroad tires	16.00 to 16.50
Railroad leaf springs	15.50 to 16.00
Axle turnings	12.75 to 13.25
Steel coup. & knuckles	15.50 to 16.00
Coil springs	16.00 to 16.50
Axle turn. (elec.)	13.75 to 14.25
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Cast iron borings	7.00 to 7.50
Short shov. turnings	8.00 to 8.50
Machine shop turn.	7.00 to 7.50
Rerolling rails	15.25 to 15.75
Steel rails under 3 ft.	17.00 to 17.50
Steel rails under 2 ft.	17.25 to 17.75
Angle bars, steel	15.75 to 16.25
Cast iron carwheels	14.00 to 14.50
Railroad malleable	17.50 to 18.00
Agric. malleable	14.50 to 15.00

Per Net Ton

Iron car axles	\$18.00 to \$18.50
Steel car axles	14.75 to 15.25
No. 1 RR. wrought.	13.00 to 13.50
No. 2 RR. wrought.	13.00 to 13.50
No. 2 busheling, old	7.50 to 8.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Clean auto. cast	12.00 to 12.50
No. 1 railroad cast	11.50 to 12.00
No. 1 agric. cast	10.50 to 11.00
Stove plate	8.00 to 8.50
Grate bars	9.00 to 9.50
Brake shoes	9.50 to 10.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mtng. steel	\$13.50
No. 2 hvy. mtng. steel	\$12.00 to \$12.50
Scrap rails	13.00 to 13.50
New hydraul. bundles	12.00 to 12.50
Old hydraul. bundles	11.00
Drop forge flashings	11.50 to 11.75
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings	12.00 to 12.50
Machine shop turn.	7.75 to 8.25
Knuckles & couplers	15.50 to 16.00
Coil & leaf springs	15.50 to 16.00
Roller steel wheels	15.50 to 16.00
Low phos. billet crops	16.00 to 16.50
Short shov. turnings	8.25 to 8.75
Mixed bor. & turn.	8.25 to 8.75
Cast iron borings	8.25 to 8.75
No. 2 bushelings	7.00
Steel car axles	14.00 to 14.50
Iron axles	12.50 to 13.00
No. 1 machinery cast	13.50 to 14.00
No. 1 cupola cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Steel rails, under 3 ft.	16.00 to 16.50
Cast iron carwheels	12.00 to 12.50
Railroad malleable	16.25 to 16.75
Chemical borings	9.00 to 9.50

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Hvy. melting steel	\$11.00 to \$11.50
Scrap steel rails	11.50 to 12.00
Short shov. turnings	7.00
Stove plates	8.00
Steel axles	12.00 to 12.50
Iron axles	12.00 to 12.50
No. 1 RR. wrought	8.50 to 9.00
Rails for rolling	12.50 to 13.00
No. 1 cast	12.00 to 12.50
Tramcar wheels	11.00 to 12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:	
Selected hvy. steel	\$12.50 to \$13.00
No. 1 hvy. melting	12.25 to 12.75
No. 2 hvy. melting	11.00 to 11.50
No. 1 locomotive tires	11.00 to 11.50

Misc. stand-sec. rails	\$13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought	12.25 to 12.75
No. 1 busheling	7.50 to 8.00
Cast bor. & turn.	4.50 to 5.00
Rails for rolling	13.75 to 14.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	9.25 to 9.75
Steel car axles	13.00 to 13.50
Iron car axles	15.00 to 16.00
No. 1 RR. wrought	10.50 to 11.00
Steel rails under 3 ft.	13.50 to 14.00
Steel angle bars	13.00 to 13.50
Cast iron carwheels	11.00 to 11.50
No. 1 machinery cast	11.25 to 11.75
Railroad malleable	14.25 to 14.75
No. 1 railroad cast	11.25 to 11.75
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel	\$11.75 to \$12.25
No. 2 hvy. mtng. steel	9.75 to 10.25
Scrap rails for mtng.	11.25 to 11.75
Loose sheet clippings	7.25 to 7.75
Bundled sheets	8.75 to 9.25
Cast iron borings	6.75 to 7.25
Machine shop turn.	7.50 to 8.00
No. 1 busheling	9.25 to 9.75
No. 2 busheling	5.00 to 5.50
Rails for rolling	11.75 to 12.25
No. 1 loco. tires	10.25 to 10.75
Short rails	14.75 to 15.25
Cast iron carwheels	11.25 to 11.75
No. 1 machinery cast	12.25 to 12.75
No. 1 railroad cast	11.50 to 12.00
Burnt cast	8.50 to 9.00
Stove plate	8.50 to 9.00
Agricul. malleable	10.50 to 11.00
Railroad malleable	12.25 to 12.75

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel	\$11.00 to \$11.50
No. 2 hvy. mtng. steel	9.75 to 10.25
Borings and turnings	6.25 to 6.75
Long turnings	6.25 to 6.75
Short shov. turnings	6.25 to 7.25
No. 1 machinery cast	14.50 to 15.00
Automotive cast	14.00 to 14.50
Hydraul. comp. sheets	11.50 to 12.00
Stove plate	8.75 to 9.25
New factory bushel.	10.50 to 11.00
Old No. 2 busheling	5.75 to 6.25
Sheet clippings	8.50 to 9.00
Flashings	10.00 to 10.50
Low phos. plate scrap	11.25 to 11.75

CANADA

Dealers' buying prices per gross ton:	
	Toronto
Hvy. melting steel	\$7.50
Rails, scrap	8.50
Machine shop turn.	4.00
Boiler plate	7.00
Hvy. axle turnings	4.50
Cast borings	5.00
Steel borings	4.00
Wrought pipe	4.00
Steel axles	8.50
Axles, wrought iron	9.00
No. 1 machinery cast	11.50
Stove plate	7.50
Standard carwheels	11.00
Malleable	7.00
Shoveling steel	6.50
Bushelings	6.00
Compressed sheets	6.50

YOUNGSTOWN

Per gross ton, delivered consumers' yards:	
No. 1 hvy. mtng. steel	\$15.25 to \$15.75
Hydraulic bundles	15.25 to 15.75
Machine shop turn.	11.50 to 11.75

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel	\$9.50 to \$10.00
No. 2 hvy. mtng. steel	8.50 to 9.00
Hvy. breakable cast.	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 2 cast	8.75 to 9.00
Stove plate	7.25 to 7.50
Steel car axles	13.50 to 14.00
Shafting	14.50 to 14.75
No. 1 RR. wrought	9.50 to 10.00
No. 1 wrought long.	8.50 to 9.00
Spec. iron & steel pipe	8.50 to 9.00
Forge fire	7.50 to 8.00
Rails for rollings	11.00 to 12.00
Short shov. turnings	5.00 to 5.50
Machine shop turn.	4.50 to 5.00
Cast borings	4.50 to 5.00
No. 1 blast furnace	3.00 to 3.50
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap	6.25 to 6.75

Per gross ton, delivered local foundries:	
No. 1 machin. cast.	\$12.00
No. 1 hvy. cast cupola	10.00
No. 2 cast	8.50

NORTH JERSEY

Dealers' buying prices per gross ton:	
Add 50c. to 75c. to dealers' prices listed under New York market.	

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mtng. steel	\$9.40 to \$9.90
Scrap rails	9.40 to 9.90
No. 2 steel	8.75 to 9.00
Breakable cast	8.25 to 8.75
Machine shop turn.	4.40 to 4.50
Bund. skeleton, long.	8.00 to 8.05
Shafting	13.75 to 14.00
Engine blocks, strip.	9.25 to 9.75
Cast bor., chemical	5.00 to 7.00
Cotton ties	6.25 to 6.50

Per gross ton delivered consumers' yards:	
Textile cast	\$10.50 to \$11.00
No. 1 machin. cast.	10.50 to 11.00
Stove plate	9.00

EXPORT

Brokers' Buying Prices, Per Gross Ton:	
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New York, delivered alongside barges	
No. 1 hvy. mtng. steel	\$9.50 to \$10.00
No. 2 hvy. mtng. steel	8.50 to 9.00
No. 2 cast	8.50 to 8.75
Stove plate	7.25 to 7.50
Rails (scrap)	11.00 to 11.25

Philadelphia, on cars at Port Richmond	
No. 1 heavy melting steel	\$13.00

Boston, on cars at Army Base or Mystic Wharf	
No. 1 hvy. mtng. steel	\$11.50 to \$12.00
No. 2 hvy. mtng. steel	10.50 to 11.00
Rails (scrap)	11.50 to 12.00
Machine shop turn.	6.00 to 6.25
Stove plate	7.50 to 7.75

New Orleans, on cars at Stuyvesant Dock	
No. 1 hvy. mtng. steel	\$11.00 to \$11.50
No. 2 hvy. mtng. steel	10.00 to 10.50

Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mtng. steel	\$10.75 to \$11.25
Compressed bundles	8.75 to 9.25

RAW AND SEMI-FINISHED STEEL

Billets, Blooms and Slabs	
F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.	
	<i>Per Gross Ton</i>
Rerolling	\$28.00
Forging quality	35.00
Delivered* Detroit	
Rerolling	\$31.00
Forging	38.00
Billets Only F.o.b. Duluth	
Rerolling	\$30.00
Forging	37.00
Sheet Bars	
F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.	
	<i>Per Gross Ton</i>
Open-hearth or Bessemer	\$28.00

Skelp	
F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.	
	<i>Per Lb.</i>
Grooved	1.80c.
Universal	1.80c.
Sheared	1.80c.
Wire Rods	
(Nos. 4 and 5)	
	<i>Per Gross Ton</i>
F.o.b. Pittsburgh	\$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

FINISHED IRON AND STEEL

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Gary	1.90c.
F.o.b. Duluth	2.00c.
Del'd Detroit	2.00c.
F.o.b. Cleveland	1.90c.
F.o.b. Buffalo	1.95c.
Del'd Philadelphia	2.16c.
Del'd New York	2.20c.
F.o.b. Birmingham	2.00c.
F.o.b. cars dock Gulf ports...	2.25c.
F.o.b. cars Pacific ports.....	2.40c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports...	2.10c.
F.o.b. cars dock Pacific ports...	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports...	2.45c.
F.o.b. cars dock Pacific ports...	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports...	2.30c.
F.o.b. cars dock Pacific ports...	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)...	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	<i>Base per Lb.</i>
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan.....	2.35c.

*In quantities of 10,000 to 19,999 lb.

Plates	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.99c.
Del'd New York	2.09c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports...	2.20c.
F.o.b. cars dock Pacific ports...	2.35c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports...	3.75c.
F.o.b. cars dock Pacific ports...	3.90c.

Structural Shapes

	<i>Base per Lb.</i>
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.015c.
Del'd New York	2.0625c.
F.o.b. Birmingham (standard)...	1.95c.
F.o.b. cars dock Gulf ports...	2.20c.
F.o.b. cars dock Pacific ports...	2.35c.

Steel Sheet Piling

	<i>Base per Lb.</i>
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports...	2.60c.
F.o.b. cars dock Pacific ports...	2.60c.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton.....	\$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	\$35.00
Light rails (from rail steel) per gross ton	34.00

Base per 100 Lb.

Spikes, 9/16 in. and larger	\$2.60
Spikes, ½ in. and smaller.....	2.60
Tie plates, steel	1.90
Tie plates, Pacific Coast ports..	2.00
Track bolts, to steam railroads..	3.60
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapolis, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	<i>Base per Lb.</i>
No. 10, f.o.b. Pittsburgh.....	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Philadelphia	2.16c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. cars dock Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.45c. to 2.60c.
No. 24, del'd Philadelphia	2.71c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. cars dock Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh...	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, f.o.b. Detroit.....	2.70c.
No. 10 gage, del'd Philadelphia..	2.81c.
No. 10 gage, f.o.b. Birmingham..	2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh...	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit.....	3.15c.
No. 20 gage, del'd Philadelphia..	3.26c.
No. 20 gage, f.o.b. Birmingham..	3.10c.
No. 20 f.o.b. cars dock Pacific ports	3.50c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh...	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Philadelphia	3.41c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. cars dock Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. Gary	3.50c.
F.o.b. cars dock Pacific ports.....	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.95c.
No. 20, f.o.b. Gary	3.05c.
No. 20, f.o.b. Birmingham	3.55c.
No. 20, f.o.b. cars dock Pacific ports	3.55c.
No. 10, f.o.b. Pittsburgh	2.35c.
No. 10, f.o.b. Gary	2.45c.
No. 10, f.o.b. Birmingham	2.95c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific Coast ports	3.35c.

Tin Plate

	<i>Base per Box</i>
Standard cokes, f.o.b. Pittsburgh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.....	\$10.00
15-lb. coating I.C.....	12.00
20-lb. coating I.C.....	13.00
25-lb. coating I.C.....	14.00
30-lb. coating I.C.....	15.25
40-lb. coating I.C.....	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ in.

	<i>Base per Lb.</i>
All widths up to 24 in., Pgh.....	1.85c.
All widths up to 24 in., Chicago..	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh ..	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.40c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above. Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	\$2.10
Smooth coated nails	2.10

	Base per 100 Lb.
Annealed fence wire	\$2.65
Galvanized fence wire	3.00
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Twisted barbed wire	2.60
Woven wire fence, base column	\$58.00
Single loop bale ties, base column	51.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh; and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57 37	1/4	91 1/2 + 138
1/2	60 44 1/2	1/2	94 3/4 + 141 1/2
3/4	64 55	3/4	31 1/2 15
1	67 59	1	36 1/2 20 1/2
1 1/4	69 61 1/2	1 1/4	39 1/2 25 1/2
2	72 64 1/2	2	43 1/2 28
3	75 67 1/2	3	47 1/2 31 1/2
4	78 70 1/2	4	51 1/2 34 1/2
6	84 76 1/2	6	57 1/2 39 1/2
8	89 81 1/2	8	62 1/2 44 1/2
10	94 86 1/2	10	67 1/2 49 1/2
12	99 91 1/2	12	72 1/2 54 1/2

Lap Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57 37	1/4	91 1/2 + 138
1/2	60 44 1/2	1/2	94 3/4 + 141 1/2
3/4	64 55	3/4	31 1/2 15
1	67 59	1	36 1/2 20 1/2
1 1/4	69 61 1/2	1 1/4	39 1/2 25 1/2
2	72 64 1/2	2	43 1/2 28
3	75 67 1/2	3	47 1/2 31 1/2
4	78 70 1/2	4	51 1/2 34 1/2
6	84 76 1/2	6	57 1/2 39 1/2
8	89 81 1/2	8	62 1/2 44 1/2
10	94 86 1/2	10	67 1/2 49 1/2
12	99 91 1/2	12	72 1/2 54 1/2

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57 37	1/4	91 1/2 + 138
1/2	60 44 1/2	1/2	94 3/4 + 141 1/2
3/4	64 55	3/4	31 1/2 15
1	67 59	1	36 1/2 20 1/2
1 1/4	69 61 1/2	1 1/4	39 1/2 25 1/2
2	72 64 1/2	2	43 1/2 28
3	75 67 1/2	3	47 1/2 31 1/2
4	78 70 1/2	4	51 1/2 34 1/2
6	84 76 1/2	6	57 1/2 39 1/2
8	89 81 1/2	8	62 1/2 44 1/2
10	94 86 1/2	10	67 1/2 49 1/2
12	99 91 1/2	12	72 1/2 54 1/2

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57 37	1/4	91 1/2 + 138
1/2	60 44 1/2	1/2	94 3/4 + 141 1/2
3/4	64 55	3/4	31 1/2 15
1	67 59	1	36 1/2 20 1/2
1 1/4	69 61 1/2	1 1/4	39 1/2 25 1/2
2	72 64 1/2	2	43 1/2 28
3	75 67 1/2	3	47 1/2 31 1/2
4	78 70 1/2	4	51 1/2 34 1/2
6	84 76 1/2	6	57 1/2 39 1/2
8	89 81 1/2	8	62 1/2 44 1/2
10	94 86 1/2	10	67 1/2 49 1/2
12	99 91 1/2	12	72 1/2 54 1/2

On butt-weld and lap-weld steel pipe jobs are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	\$48.40
*4-in., del'd Chicago	51.40
6-in. and larger, del'd New York	45.20
4-in., del'd New York	48.20
*6-in. and larger, Birmingham	40.00
*4-in. Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
4-in., f.o.b. dock, San Francisco or Los Angeles	51.00
F.o.b. dock, Seattle	51.50
Class "A" and gas pipe, \$3 extra.	

*Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$39. Birmingham, and \$47.40, delivered Chicago and 4-in. pipe, \$42. Birmingham, and \$50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller	70, 10 and 5
Larger than 1/2 in.	70 and 10
Lag bolts	70 and 10
Flange bolts, Nos. 1, 2, 3, and 7	70 and 10
Hot-pressed nuts, blank or tapped, square	70 and 10
Hot-pressed nuts, blank or tapped, hexagon	70 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl.	70 and 10
1 in. diameter	60, 20 and 15
Larger than 1 in. diameter	60, 20 and 15
Stove bolts in packages, Pittsburgh, 72 1/2 and 10	
Stove bolts in packages, Chicago, 72 1/2 and 10	
Stove bolts in packages, Cleveland, 72 1/2 and 10	
Stove bolts in bulk, Pittsburgh	82 1/2
Stove bolts in bulk, Chicago	82 1/2
Stove bolts in bulk, Cleveland	82 1/2
Tire bolts	55

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 3/4 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Uncropped \$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is \$52. F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base \$2.45c. Delivered price at Detroit is \$2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1/2% Nickel)	\$0.25
2100 (2 1/2% Nickel)	0.95
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel...base	
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	\$0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/4c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

Base per Lb.

High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Prices are same for warehouse distribution to all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

British and Continental Prices BRITISH

Per Gross Ton

f.o.b. United Kingdom Ports

Based on exchange rate as of April 13.

Ferromanganese, export	\$44.48
Billets, open-hearth	29.03 to \$30.27
Tin plate, per base box	4.63 to 4.99
Steel bars, open-hearth	38.91
Beams, open-hearth	37.69
Channels, open-hearth	38.91
Angles, open-hearth	37.69
Black sheets, No. 24 gage	47.07
Galvanized sheets, No. 24 gage	59.96

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports Based on exchange rate of April 13.

Billets, Thomas	\$19.22
Wire rods, No. 5 B.W.G.	36.81
Steel bars, merchant	26.58
Sheet bars	19.63
Plate, 1/4 in. and up	35.38
Plate, 3/16 in. and 5 mm.	34.76
Sheets, 1/4 in.	36.81
Beams, Thomas	25.56
Angles (Basic)	25.56
Hoops and strip base	32.71
Wire, plain, No. 8	43.97
Wire nails	47.03
Wire, barbed, 4 pt. No. 10 B.W.G.	70.57

PIG IRON AND RAW MATERIALS

PIG IRON

No. 2 Foundry	
F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md., and Switching District	\$20.50
Delivered Boston Switching District	21.00
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	20.5807
Delivered Canton, Ohio	20.8482
Delivered Columbus, Ohio	21.64
Delivered Mansfield, Ohio	21.3832
Delivered Indianapolis	21.9289
Delivered South Bend, Ind.	21.6935
Delivered Milwaukee	20.57
Delivered Davenport, Iowa	21.3832
Delivered Kansas City	22.2178
F.o.b. Duluth	20.00
Delivered St. Paul	21.94
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.50

*Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	\$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia	20.8132
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	20.0807
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.	\$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa. and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham	20.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$24.00
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Gray Forge

Valley furnace	\$19.00
Pittsburgh district furnace	19.00

Charcoal

Lake Superior furnace	\$22.00
Delivered Chicago	25.2528
Delivered Buffalo	25.595

Canadian Pig Iron

Per Gross Ton	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$75.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	130.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6.00 to 6.50%	\$22.75
6.51 to 7.00%	23.25
7.01 to 7.50%	23.75
7.51 to 8.00%	24.25
8.01 to 8.50%	24.75
8.51 to 9.00%	25.25
9.01 to 9.50%	25.75
9.51 to 10.00%	26.25
10.01 to 10.50%	26.75
10.51 to 11.00%	27.25
11.01 to 11.50%	27.75
11.51 to 12.00%	28.25

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10.00 to 10.50%	\$27.75
10.51 to 11.00%	28.25
11.01 to 11.50%	28.75
11.51 to 12.00%	29.25
12% or over	30.25

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrocromium, 2% carbon	16.50c. to 17.00c.
Ferrocromium, 1% carbon	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% iron dry Spanish or Algeria	10.25c.
Iron, low phos., Swedish, average, 68 1/2% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	25c.
Manganese, African, Indian, 49-51%	26c.
Manganese, Brazilian, 46 to 48 1/2%	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered, nominal	\$16.00
Tungsten, domestic, scheelite delivered, nominal	16.00

Per Gross Ton

Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African)	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish)	\$16.50 to 17.00
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish)	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic Seaboard	22.00
52% Cr ₂ O ₃ (Turkish)	21.75
48 to 49% Cr ₂ O ₃ (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all rail shipment	\$18.00
Domestic, barge and rail shipment	19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.25c.
No. 4 industrial	3.87 1/2c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.25c.
No. 4 industrial	3.87 1/2c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	5.00c.
No. 5 industrial fuel oil	3.77c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	6.00c.
No. 4 industrial	5.75c.
No. 5 industrial	5.25c.

COKE AND COAL

Coke		Per Net Ton
Furnace, f.o.b. Connells-ville Prompt	.....	\$3.65 to \$3.80
Foundry, f.o.b. Connells-ville Prompt	.....	4.25 to 5.75
Foundry, by-product, Chicago ovens, for delivery outside switching district	.....	9.00
Foundry, by-product, delivery in Chicago switching district	.....	9.75
Foundry, by-products, New England, delivered	.....	11.50
Foundry, by-product, Newark or Jersey City, delivered	.....	9.65
Foundry, by-product, Philadelphia	.....	9.38
Foundry, by-product, Cleveland, delivered	.....	9.75
Foundry, by-product, Cincinnati, del'd	.....	9.50
Foundry, Birmingham	.....	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	.....	8.00
Foundry, by-product, del'd St. Louis	.....	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	.....	14.75

Coal		Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	.....	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	.....	1.90 to 2.10
Gas coal, 1/4-in. f.o.b. Pa. mines	.....	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	.....	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	.....	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	.....	1.20 to 1.45

REFRACTORIES

Fire Clay Brick		Per 1000 f.o.b. Works
	Inter- High-heat Duty Brick	mediate Duty Brick
Pennsylvania	.....	\$45.00 \$40.00
Maryland	.....	45.00 40.00
New Jersey	.....	50.00 43.00
Ohio	.....	40.00 35.00
Kentucky	.....	45.00 40.00
Missouri	.....	45.00 40.00
Illinois	.....	45.00 40.00
Ground fire clay, per ton	.....	7.00

Silica Brick		Per 1000 f.o.b. Works
Pennsylvania	.....	\$45.00
Chicago District	.....	54.00
Birmingham	.....	\$43.00 to 50.00
Silica cement per net ton	.....	8.00

Chrome Brick		Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	.....	\$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	.....	45.00

Magnesite Brick		Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	.....	\$65.00
Chemically bonded, f.o.b. Baltimore	.....	55.00

Grain Magnesite		Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	.....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	.....	40.00
Domestic, f.o.b. Chewelah, Wash.	.....	22.00

WAREHOUSE PRICES

PITTSBURGH

Base per Lb.	
Plates	..... 3.15c.
Structural shapes	..... 3.15c.
Soft steel bars and small shapes	..... 2.95c.
Reinforcing steel bars	..... 2.95c.
Cold-finished and screw stock:	
Rounds and hexagons	..... 3.35c.
Squares and flats	..... 3.35c.
Hoops and bands under 1/4 in.	..... 3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	..... 3.30c.
Galv. sheets (No. 24), 25 or more bundles	..... 3.95c.
Hot-rolled sheets (No. 10)	..... 2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	..... \$3.69
Spikes, large	..... 3.10c.
Track bolts, all sizes, per 100 count	..... 65 per cent off list
Machine bolts, 100 count	..... 65 per cent off list
Carriage bolts, 100 count	..... 65 per cent off list
Nuts, all styles, 100 count	..... 65 per cent off list
Large rivets, base per 100 lb.	..... \$3.80
Wire, black, soft ann'd, base per 100 lb.	..... 2.90c.
Wire, galv. soft, base per 100 lb.	..... 3.25c.
Common wire nails, per keg	..... 2.35c.
Cement coated nails, per keg	..... 2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.
*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.	
Plates and structural shapes	..... 3.20c.
Soft steel bars, rounds	..... 3.00c.
Soft steel bars, squares and hexagons	..... 3.15c.
Cold-fin. steel bars:	
Rounds and hexagons	..... 3.50c.
Flats and squares	..... 3.50c.
Hot-rolled strip	..... 3.30c.
Hot-rolled annealed sheets (No. 24)	..... 3.85c.
Galv. sheets (No. 24)	..... 4.55c.
Hot-rolled sheets (No. 10)	..... 3.05c.
Spikes (keg lots)	..... 3.50c.
Track bolts (keg lots)	..... 4.65c.
Rivets, structural (keg lots)	..... 3.65c.
Rivets, boiler (keg lots)	..... 3.75c.
Per Cent Off List	
Machine bolts	..... *70
Carriage bolts	..... *70
Lag screws	..... *70
Hot-pressed nuts, sq. tap or blank	..... *70
Hot-pressed nuts, hex. tap or blank	..... *70
Hex. head cap screws	..... 87 1/2
Cut point set screws	..... 75 and 10
Flat head bright wood screws	..... 70
Spring cotters	..... 55
Stove bolts in full packages	..... 70
Rd. hd. tank rivets, 7/16 in. and smaller	..... 57 1/2
Wrought washers	..... \$4.50 off list
Black ann'd wire per 100 lb.	..... \$3.85
Com. wire nails, base per keg	..... 2.95†
Cement c'd nails, base per keg	..... 2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.
†Prices for city and suburbs only.

NEW YORK

Base per Lb.	
Plates, 1/4 in. and heavier	..... 3.40c.
Structural shapes	..... 3.37c.
Soft steel bars, rounds	..... 3.31c.
Iron bars	..... 3.31c.
Iron bars, Swed. charcoal	..... 6.75c. to 7.00c.

Cold-fin. shafting and screw stock:	
Rounds and hexagons	..... 3.81c.
Flats and squares	..... 3.81c.
Cold-rolled; strip, soft and quarter hard	..... 3.36c.
Hoops	..... 3.56c.
Bands	..... 3.56c.
Hot-rolled sheets (No. 10)	..... 3.31c.
Hot-rolled ann'd sheets (No. 24*)	..... 3.89c.
Galvanized sheets (No. 24*)	..... Special
Long terme sheets (No. 24)	..... 5.25c.
Standard tool steel	..... 11.00c.
Wire, black annealed (No. 10)	..... 3.40c.
Wire, galv. (No. 10)	..... 3.75c.
Tire steel, 1 x 1/2 in. and larger	..... 3.75c.
Open-hearth spring steel	..... 4.00c. to 10.00c.
Common wire nails, base per keg	..... \$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	..... 65 and 10
Carriage bolts, cut thread:	
All diameters	..... 65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	..... \$18.05
Seamless welded, 2-in.	..... 19.24
Charcoal iron, 2-in.	..... 24.94
Charcoal iron, 4-in.	..... 63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.	
Plates and struc. shapes	..... 3.45c.
Bars, soft steel (rounds and flats)	..... 3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	..... 3.40c.
Cold-fin. rounds, shafting, screw stock	..... 3.75c.
Hot-rolled annealed sheets (No. 24)	..... 4.10c.
Galv. sheets (No. 24)	..... 4.65c.
Hot-rolled sheets (No. 10)	..... 3.30c.
Black corrug. sheets (No. 24)	..... 4.10c.
*Galv. corrug. sheets	..... 4.65c.
Structural rivets	..... 4.00c.
Boiler rivets	..... 4.10c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	..... 55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	..... 70

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.	
*Plates, 1/4 in. and heavier	..... 2.98c.
*Structural shapes	..... 2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	..... 3.03c.
†Reinforc. steel bars, sq. twisted and deformed	..... 2.96c.
Cold-finished steel bars	..... 3.76c.
*Steel hoops	..... 3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	..... 3.18c.
Spring steel	..... 5.00c.
†Hot-rolled anneal sheets (No. 24)	..... 3.65c.
†Galvanized sheets (No. 24)	..... 4.40c.
*Hot-rolled annealed sheets (No. 10)	..... 3.08c.
Diam. pat. floor plates, 1/4 in.	..... 4.95c.
Swedish iron bars	..... 6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.	
Plates and struc. shapes	..... 3.31c.
Soft steel bars	..... 3.00c.
Reinforc. steel bars	..... 2.10c.
†Cold-finished steel bars	..... 3.50c.
Flat-rolled steel under 1/4 in.	..... 3.36c.
Cold-finished strip	..... †3.00c.

Hot-rolled annealed sheets (No. 24).....	3.91c.
Galvanized sheets (No. 24).....	4.61c.
Hot-rolled sheets (No. 10).....	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets.....	3.56c.
*Black ann'l'd wire, per 100 lb.....	\$2.40
*No. 9 galv. wire, per 100 lb.....	2.75
*Com. wire nails, base per keg..	2.35

†Outside delivery 10c. less.
*For 5000 lb. or less.

CINCINNATI

<i>Base per Lb.</i>	
Plates and struc. shapes.....	3.42c.
Bars, rounds, flats and angles.....	3.22c.
Other shapes.....	3.37c.
Rail steel reinforc. bars.....	3.25c.
Hoops and bands, 3/16 in. and lighter.....	3.47c.
Cold-finished bars.....	3.72c.
Hot-rolled annealed sheets (No. 24).....	4.02c.
Galv. sheets (No. 24).....	4.72c.
Hot-rolled sheets (No. 10).....	3.22c.
Structural rivets.....	4.35c.
Small rivets.....	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over).....	\$2.88
Com. wire nails, base per keg: Any quantity less than carload..	3.04
Cement c'd nails, base 100-lb. keg.....	3.50
Chain, lin. per 100 lb.....	8.35
<i>Net per 100 Ft.</i>	
Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

<i>Base per Lb.</i>	
Plates.....	3.88c.
Struc. shapes.....	3.25c.
Soft steel bars.....	3.05c.
Reinforcing bars.....	2.60c.
Cold-fin. flats and sq.	3.55c.
Rounds and hex.	3.55c.
Cold-rolled strip steel.....	3.19c.
Hot-rolled annealed sheets (No. 24).....	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide).....	3.63c.
Galv. sheets (No. 24).....	4.70c.
Bands.....	3.43c.
Hoops.....	3.43c.
Heavy hot-rolled sheets.....	3.18c.
Com. wire nails, base per keg.....	\$3.15
Black wire, base per 100 lb. (2500-lb. lots or under).....	3.50
(Over 2500 lb.).....	3.40

BOSTON

<i>Base per Lb.</i>	
Beams, channels, angles, tees, zeos.....	3.54c.
H beams and shapes.....	3.54c.
Plates—Sheared, tank, and univ. mill, 1/4 in. thick and heavier.....	3.56c.
Floor plates, diamond pattern.....	5.36c.
Bar and bar shapes (mild steel).....	3.45c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels.....	4.70c.
Tire steel.....	4.70c.
Cold-rolled strip steel.....	3.245c.
Cold-finished rounds, squares and hexagons.....	3.90c.
Cold-finished flats.....	3.90c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga.....	5.85c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

<i>Base per Lb.</i>	
Soft steel bars.....	3.09c.
Structural shapes.....	3.42c.
Plates.....	3.42c.
Floor plates.....	5.17c.
Hot-rolled annealed sheets (No. 24).....	3.94c.
Hot-rolled sheets (No. 10)....	3.14c.

Galvanized sheets (No. 24)*..	4.72c.
Bands.....	3.39c.
Hoops.....	3.39c.
†Cold-finished bars.....	3.64c.
Cold-rolled strip.....	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series).....	5.23c.*
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases.....	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

*Price applies to 1,000 lb. and over.
†With reduction in chemical extras.

**0.25c. off list for 10 to 25 bundles; 0.50c. for 25 bundles and over, Detroit delivery only.

MILWAUKEE

<i>Base per Lb.</i>	
Plates and structural shapes..	3.31c.
Soft steel bars, rounds up to 8 in., flats and fillet angles.....	3.11c.
Soft steel bars, squares and hexagons.....	3.26c.
Hot-rolled strip.....	3.41c.
Hot-rolled sheets (No. 10).....	3.16c.
Hot-rolled annealed 3/16—24 in. to 48 in. wide incl.	3.41c.
Hot-rolled annealed sheets (No. 24).....	3.96c.
Galvanized sheets (No. 20)....	4.66c.
Cold-finished steel bars.....	3.61c.
Cold-rolled strip.....	3.33c.
Structural rivets (keg lots) ..	3.86c.
Boiler rivets, cone head (keg lots).....	3.96c.
Track spikes (keg lots).....	3.91c.
Track bolts (keg lots).....	4.91c.
Black annealed wire.....	3.15c.
Com. wire nails.....	2.60c.
Cement coated nails.....	2.60c.
<i>Per Cent Off List</i>	
Machine bolts, 1/2x6 and smaller...	70
Larger than 1/2x6.....	65 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots).....	65 and 10

Prices given above are delivered Milwaukee.
On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

<i>Base per Lb.</i>	
Mild steel bars, rounds.....	3.25c.
Structural shapes.....	3.45c.
Plates.....	3.45c.
Cold-finished bars.....	4.02c.
Bands and hoops.....	3.55c.
Hot-rolled annealed sheets, No. 24.....	3.90c.
Galvanized sheets, No. 24.....	4.50c.
Cold-rolled sheets, No. 20.....	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

<i>Base per Lb.</i>	
*Mild steel bars.....	3.00c.
**Reinforcing bars.....	2.85c.
*Structural shapes.....	3.00c.
†Plates.....	3.00c.
†Hot-rolled sheets, No. 10.....	3.10c.
†Hot-rolled annealed sheets, No. 24.....	3.60c.
†Galvanized sheets, No. 24....	4.30c.
*Bands.....	3.20c.
*Hoops.....	3.45c.
§Cold-rolled rounds.....	3.78c.
§Cold-rolled squares, hex. and flats.....	3.78c.
Rivets.....	4.40c.
Bolts and nuts, per cent off list	
60 and 10	

*Quantity extras per size apply.
†Quantity extras per thickness apply.
Hot-rolled quantity extras are: 2000

lb. and over, base: 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb. add 30c.; 0 to 999 lb., add 50c.
‡25 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 24 bundles add 25c.
§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add \$1.00; for 0 to 299 lb. add \$1.75; for combined order under 100 lb. add \$3.00.
**For orders 4000 lb. to 9999 lb. Add 15c. per 100 lb. for orders 2000 to 3999 lb.; add 65c. for orders less than 2000 lb.

CHATTANOOGA

<i>Base per Lb.</i>	
Mild steel bars.....	3.36c.
Iron bars.....	3.36c.
Reinforcing bars.....	3.36c.
Structural shapes.....	3.56c.
Plates.....	3.56c.
Hot-rolled sheets, No. 10.....	3.36c.
Hot-rolled annealed sheets No. 24.....	4.16c.
Galvanized sheets, No. 24.....	4.86c.
Steel bands.....	3.61c.
Cold-finished bars.....	4.13c.

MEMPHIS

<i>Base per Lb.</i>	
Mild steel bars.....	3.47c.
Shapes, bar size.....	3.47c.
Iron bars.....	3.47c.
Structural shapes.....	3.67c.
Plates.....	3.67c.
Hot-rolled sheets, No. 10.....	3.47c.
Hot-rolled annealed sheets, No. 24.....	4.27c.
Galvanized sheets, No. 24.....	4.80c.
Steel bands.....	3.72c.
Cold-drawn rounds.....	3.89c.
Cold-drawn flats, squares, hexagons.....	5.89c.
Structural rivets.....	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list.	50

NEW ORLEANS

<i>Base per Lb.</i>	
Mild steel bars.....	3.35c.
Reinforcing bars.....	3.50c.
Structural shapes.....	3.55c.
Plates.....	3.55c.
Hot-rolled sheets, No. 10.....	3.55c.
Hot-rolled annealed sheets, No. 24.....	4.35c.
Galvanized sheets, No. 24.....	4.95c.
Steel bands.....	3.95c.
Cold-finished steel bars.....	4.30c.
Structural rivets.....	4.25c.
Boiler rivets.....	4.25c.
Common wire nails, base per keg.....	\$2.65
Bolts and nuts, per cent off list	70

PACIFIC COAST

<i>Base per Lb.</i>	
	<i>San Francisco</i>
Plates, tank and U. M.	3.25c.
Shapes, standard	3.25c.
Soft steel bars	3.25c.
Reinforcing bars, f.o.b. cars dock Pacific ports..	2.45c.
Hot-rolled annealed sheets (No. 24).....	4.00c.
Hot-rolled sheets (No. 10).....	3.35c.
Galv. sheets (No. 24).....	4.50c.
Cold finished steel	
Rounds.....	5.80c.
Squares and hexagons.	7.05c.
Flats.....	7.55c.
Common wire nails—base per keg less carload	\$3.20
Los Angeles	3.60c.
Seattle	3.55c.
	3.60c.
	3.70c.
	2.45c.
	4.35c.
	3.70c.
	4.95c.
	6.00c.
	7.10c.
	7.60c.
	\$3.20

All items subject to differentials for quantity.



THIS WEEK'S MACHINE TOOL ACTIVITIES

By L. M. WAITE

... *Effects of delayed order placing now felt.*

... *New alliances will influence foreign buying of machine tools and equipment.*

... *Detroit favors single purpose purchases as drive on fall requirements gets under way.*

ORDERS and inquiries for diversified lines of machine tools continue to be satisfactory. Regularity of orders for individual and small lots of machines is becoming established over wider areas.

Fear of the new Federal tax bill results apparently has not acted as a deterrent upon the purchaser of individual replacement machines. Radial drill prices have advanced in line with other types of machine tools.

Possible or probable foreign machine tool decisions, as they will affect American builders, are reported as hanging on present negotiations between foreign nations.

There is reported to be considerable delay in getting a number of revised production lines balanced because of slip-ups on delivery dates. An indicated result is that possible fall requirements will be given early consideration in cooperation with those machine tool builders whose standard products are now called for by the smaller shops in totally large numbers.

New England

Replacement buying in recently flooded areas has begun. One order, approximating some \$20,000, was released recently as a part of one program, while two others are reported as covering a total of seven standard machines in moderate price fields. Probabilities are held to be good for several sizable deci-

sions during the coming week or 10 days.

Metropolitan

April orders continue in pleasing volume. A consensus of dealer opinion is that March totals may be exceeded. Radial drill prices have been marked up and sales forces are active on outstanding quotations. Several orders are reported in price brackets under \$700, covering machines which have been under severe competitive bidding for some little time. A motor manufacturer has released a number of orders on a prospective list.

Detroit

There is a distinct lean toward large and more expensive equipments of single-purpose design. Deliveries on such types are averaging four months. A major part of immediate dealer activity is among automotive plants. Inquiries are in a volume calling for dealer cooperation in avoiding substitute or secondary quotations in connection with any admittedly best-suited equipments. This is a deliberate avoidance of duplicated effort in a drive to create a wholesome condition of anticipated orders.

Cleveland

The volume of business among manufacturers continues fairly good. Demand for turret lathes is holding to March figures, and there

is considerable new inquiry, all for single machines. Foreign inquiries for turret lathes have increased materially, the gain being largely from England and Sweden. Drilling machine makers report activity on inquiries for single replacement machines.

Cincinnati

Demand is sustained in areas unaffected by floods. Inquiry is brisk and operations are undiminished. In view of widening order fields, some manufacturers are predicting inadequate capacity to the extent of more seriously delayed deliveries. Business during the week included a good volume from automotive fields. A planer and several boring mills featured the heavier machines. Demand in general advanced a little, but the Cincinnati average for March has not been reached in April.

Chicago

Prospects appear to be somewhat improved though builders are far from satisfied with the current volume of orders. Allis-Chalmers Mfg. Co., Milwaukee, has not yet appropriated the money for its large list. Stewart-Warner Corp., Chicago, is completing purchase of a list and the Bucyrus-Monigan Machine Co., Chicago, has placed orders for a large planer and two boring mills. Tractor plants continue to buy machine tools now and then and the Rock Island is in the market for a 13-in. turret lathe.

Foreign

The week produced a number of British orders for standard types of machines in the smaller sizes. These are said to be for use in relieving pressure under which many industrial shops are working, a condition which exists despite a large increase in productive working capacity.

British demand during the first quarter of 1936 was largely in connection with manufacture of armaments, airplanes, motor vehicles and ship building. Official statistics indicate that imports of metal working machine tools during the first two months of 1936 were 75 per cent in advance of the like 1935 period.

In the light of the week's further international defiances, the volume of foreign machine tool orders is aptly referred to as in the swollen brook stage, having attained that velocity from the mere trickle of but a few months ago.

Probability of volume reaching stream size, is said by a much traveled machine tool distributor, to be dependent, apparently, on the make up of State alliances which are now being worked out.

PLANT EXPANSION AND EQUIPMENT BUYING



... **Ontario Paper Co., Ltd., Thorold, Ont., has plans for new mill and townsite to cost \$7,500,000.**

o o o

... **Tata Iron & Steel Co., Ltd., Bombay, India, will build new mill at Bengal, India, at a cost of \$600,000.**

o o o

... **Board of Public Utilities, Kansas City, plans large extensions and improvements to municipal electric power plant.**

o o o

... **Sloan & Zook Co., Bradford, Pa., will build a new oil recovery plant to cost \$500,000.**

o o o

... **Douglas Aircraft Co., Santa Monica, Cal., has let contract for addition to cost \$250,000.**

◀ NORTH ATLANTIC ▶

Continental Can Co., 100 East Forty-second Street, New York, plans new one-story addition to branch plant at Houston, Tex. Cost about \$250,000 with equipment. Work is scheduled to start this spring.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 21 for one motor-driven combination lathe, milling machine and drill press (Schedule 7623), one motor-driven shearing and squaring machine (Schedule 7647), two gravity convection type electrically heated ovens (Schedule 7624); until April 24, 200 oxygen cylinders, 1100 closing valves for rescue equipment and other kindred equipment (Schedule 7598) for Brooklyn Navy Yard; two frequency rotary converters and spare parts (Schedule 7630) for Brooklyn or Philadelphia yard; four electric arc welding transformers, etc. (Schedule 7626) for Brooklyn and Washington yards.

Constructing Quartermaster, United States Military Academy, West Point, N. Y., asks bids until May 6 for extensions and improvements in power plant, including one 625-kw. turbo-generator with accessories, high-pressure steam boilers and auxiliary equipment, and fuel oil storage tanks.

Central School District, Windham, N. Y., plans manual training department in new two-story central school, for which bids will be asked on general contract early in May. Cost \$275,000. Financing has been arranged through Federal aid. J. Russell White, 109 State Street, Albany, N. Y., is architect.

Purchasing and Contracting Officer, Medical Section, Army Base, Brooklyn, asks bids until May 1 for two electric furnaces for heat-treating metals, 25 conveyors, 125 electric instrument sterilizers, x-ray machines and other equipment (Circular 79).

Borough Hall Chevrolet Co., Inc., 240 Fulton Street, Brooklyn, representative for Chevrolet automobile, will make extensions and improvements in building at 33 Debevoise Place, for service and repair shop, and storage and distribution. Cost about \$45,000 with equipment. J. Sarsfield Kennedy, 157 Remsen Street, is architect.

Central School District, Marlboro, N. Y., plans manual training department in new two-story central school, for which bids will be asked soon on general contract. Cost \$370,000. Financing has been arranged through Federal aid. G. W. Betz, 286 Wall Street, Kingston, N. Y., is architect.

National Dairy Products Corp., 120 Broadway, New York, will erect new one-story repair, service and garage building, 72 x 233 ft., for motor trucks and cars of St. Louis Dairy Co., 2000 Pine Street, St. Louis, a subsidiary, in connection with new two and three-story plant addition, 100 x 210 ft., for which general contract has just been let to Fruin-Colman Contracting Co., Merchants Laclede Building, St. Louis. J. K. Anderson is company engineer. Entire project will cost over \$400,000 with equipment.

Board of Education, 22 Valley Road, Montclair, N. J., Fred P. Reagle, secretary, asks bids until April 22 for shop tools and equipment for manual training department, equipment for printing department and other supplies.

Lewis Roberts, Inc., 72-82 Union Street, Newark, N. J., manufacturer of printing inks, plans one-story addition. Cost about \$35,000 with equipment.

Campbell Soup Co., Second and Market Streets, Camden, N. J., has let general contract to Thomas F. Gibson Co., Commercial Trust Building, Philadelphia, for multi-story addition. Cost over \$100,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia,

asks bids until April 23 for 12 field artillery trainer batteries (Circular 402); until April 24, one complete unit of automatic turret multiple spindle machines for machining upper and lower caps, body and closing screw for mechanical time fuses (Circular 400); until May 1, one single action, vertical type hydraulic draw press for drawing cartridge cases (Circular 419).

Reid-Avery Co., Broad Street Station Building, Philadelphia, manufacturer of welding rods, welding wire, etc., has plans for one-story addition to plant at 2324 Chesapeake Avenue, Baltimore, 100 x 120 ft. Cost over \$50,000 with equipment.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until April 21 for 23,000 nickel steel bolts, 600 steel engine bolts, 10,400 nickel steel clevis bolts, 4000 steel clevis flathead pins, 640 gross steel machine screws, 50 gross aluminum alloy machine screws, 3000 sheet metal lock nuts, and 11,000 steel blank washers (Aero Req. 1129); until April 23, brass or bronze bushings, conduit connectors, brass or bronze couplings, indicator cones, nuts, elbows, pipe plugs, nipples, tees, pump assemblies, etc. (Aero Req. 1060).

◀ NEW ENGLAND ▶

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until April 20 for three high-speed bench type drilling machines (Circular 204); until April 23, one single surface planer (Circular 195); until May 4, overhauling and motorizing lathe (Circular 202).

Bridgeport Thermostat Co., Bridgeport, Conn., recently organized with capital of \$750,000, has acquired thermostat and bellows division of Bridgeport Brass Co., and will take immediate possession, operating as an independent unit. Temporarily, plant will be continued at present location. New company is negotiating for purchase of local factory to which it will remove and give employment to about 500 persons. New works will specialize in production of temperature control equipment and parts for electrical refrigeration, heating equipment, automobiles, etc. W. F. Macdonald and W. J. VonHarten head new company.

Moore Drop Forging Co., Walter Street, Springfield, Mass., manufacturer of drop forgings, etc., plans immediate reconditioning and improvements in plant recently damaged by flood. Loss over \$75,000 with equipment.

◀ SOUTHWEST ▶

Ramsey Accessories Mfg. Corp., 3693 Forest Park Boulevard, St. Louis, manufacturer of automobile accessories and equipment, has let general contract to Atlas Construction Co., 817 North Ninth Street, for three-story addition. Cost about \$45,000 with equipment.

Board of Public Utilities, City Hall, Kansas City, Kan., plans extensions and improvements in municipal electric power plant, with installation of new high-pressure boilers and accessories, 30,000-kw. turbo-generator unit, switchboard equipment and power substation facilities. Entire project will cost over \$1,000,000. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Anheuser-Busch, Inc., 721 Pestalozzi Street, St. Louis, brewer, has let general contract to American Construction Co., Rusk Building, Houston, Tex., for addition to branch plant at Houston, primarily for storage and distribution. Cost about \$50,000 with equipment.

Great Eastern Oil Co., 250 Rutger Street, St. Louis, has let general contract to W. C. Harting Construction Co., 722 Chestnut Street, for one-story addition to bulk storage plant, 30 x 76 ft. Cost about \$40,000 with equipment.

State Building Commission, Capitol Building, Jefferson City, Mo., Edgar M. Eagan, executive secretary, has rejected bids re-

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- 2 General Electric Co., Schenectady
- 3 The Lamson Co., Inc., Syracuse
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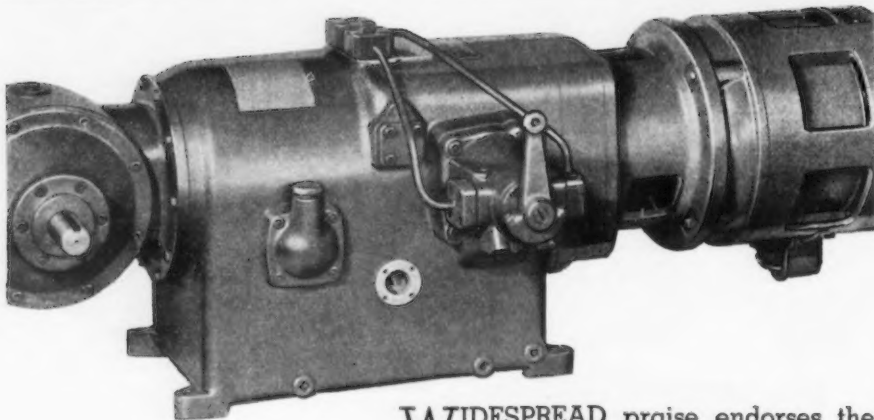
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OILGEAR *Fluid Power* VARIABLE SPEED TRANSMISSIONS

cently received for extensions and improvements in power plant at institution at Nevada, Mo., one and two stories, 77 x 115 ft., with installation of new unit. New bids will be asked soon. Cost about \$190,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers; Charles A. Haskins, Finance Building, Kansas City, is general supervising engineer.

◀ SOUTH ATLANTIC ▶

Globe-Union Mfg. Co., East Keefe Avenue, Milwaukee, manufacturer of electric storage batteries and parts, has approved plans for one-story branch plant, 100 x 200 ft., at Atlanta, Ga. Cost over \$50,000 with equipment. Company will also estab-

lish new branch manufacturing works at Memphis, Tenn., where one-story building, 120 x 200 ft., soon to be erected, has been leased.

Southern Spring Bed Co., 290 Hunter Street, Atlanta, Ga., manufacturer of metal bedsteads, bed springs, etc., has let general contract to Capital Construction Co., 62 Bartow Street, N. W., for one-story addition, 190 x 300 ft. Cost over \$75,000 with equipment.

Scripto Mfg. Co., 425 Houston Street, N. E., Atlanta, Ga., manufacturer of metallic automatic lead pencils and kindred specialties, has let general contract to Benning Construction Co., Chamber of Commerce Building, for one-story addition, 36 x 100 ft., primarily for storage and distribution. Cost \$30,000 with equipment.

◀ BUFFALO DISTRICT ▶

Greenway Brewery, Inc., 1925 Park Street, Syracuse, N. Y., has plans for one-story addition, primarily for a mechanical-bottling department. Cost close to \$40,000 with equipment. Wolfe Markam, Everson Building, is architect.

Niagara Alkali Co., 4205 Buffalo Avenue, Niagara Falls, N. Y., will make extensions and improvements in power house and pumping station, including installation of two new boiler units and auxiliary equipment, pumping machinery, etc. Cost over \$35,000. Jenks & Ballou, New Industrial Trust Building, Providence, R. I., are architects and engineers.

◀ MIDDLE WEST ▶

Peter Fox Brewing Co., 2606 West Monroe Street, Chicago, has let general contract to R. C. Wieboldt Co., Inc., 1412 West Washington Boulevard, for two additions, two and five-stories and basement respectively, for mechanical-bottling works, storage and distribution. Cost about \$100,000 with equipment. Richard Griesser & Son, 64 West Randolph Street, are architects and engineers.

Zenith Radio Corp., 3620 South Iron Street, Chicago, has leased multi-story building on opposite side of street noted, totaling about 100,000 sq. ft. floor space, for expansion. Company has negotiations under way for purchase of land for erection of new plant, on which work is expected to begin in summer. Cost over \$200,000 with machinery.

Zephyr Oil Co., 2401 Hiawatha Avenue, Minneapolis, Minn., plans additions for expansion in compounding plant, storage and distribution works, installation to include 19 steel tanks, three 340,000-gal., two 100,000-gal., and 14 17,000-gal. capacity, pumping machinery and auxiliaries, loading and unloading equipment, etc. Cost over \$60,000.

Loup River Public Power District, Columbus, Neb., C. B. Fricke, president, asks bids until April 21 for outdoor power substation equipment for generating station at Monroe, Neb., including supporting structures, steel bus supports, pedestals, oil circuit breakers, transformers, disconnecting switches and other equipment. Harza Engineering Co., 20 North Wacker Drive, Chicago, is consulting engineer.

Illinois Coil Spring Co., 2100 North Major Street, Chicago, has let general contract to John Lasky, 1416 North Kolin Avenue, for one-story addition, 50 x 125 ft., primarily for storage and distribution. Louis Simon, 179 West Washington Street, is architect.

Great Northern Utilities Co., Great Falls, Mont., plans extensions and improvements in steam-electric generating station at Shelby, Mont., with installation of new turbo-generator unit and accessory equipment. Extensions will be made in transmission lines. Entire project will cost about \$100,000.

Waukesha Foundry Co., Waukesha, Wis., has leased adjacent plant, 100 x 150 ft., from I. B. Rowell Co., for bronze casting production, and will devote its own shop, 110 x 225 ft., exclusively to nickel-alloy and aluminum castings. Products go largely into food industries.

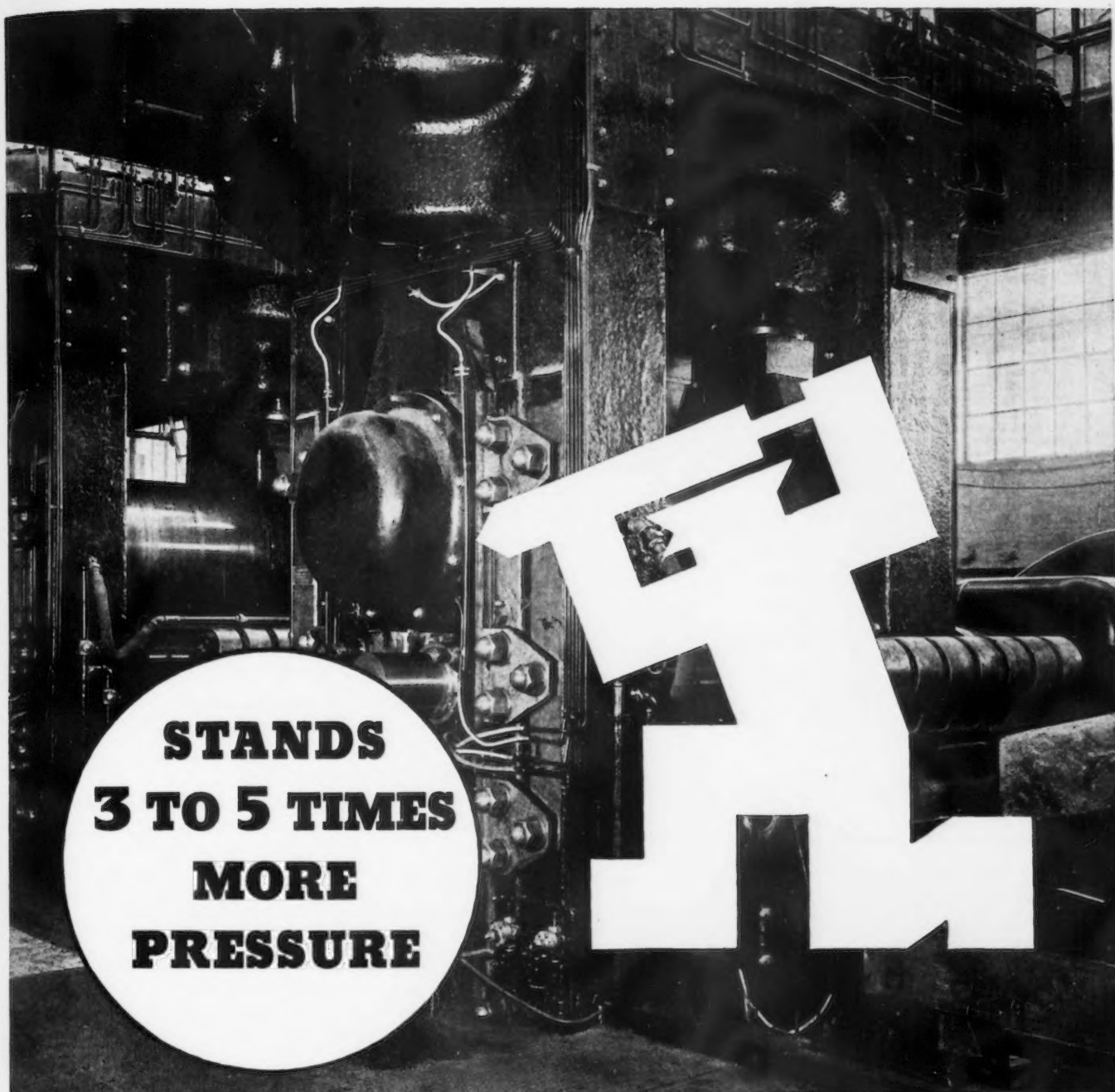
Automatic Screw Machine Products Co., 2223 South Austin Avenue, Milwaukee, has purchased shop at 524 South Second Street, affording 15,000 sq. ft. of manufacturing space, and will transfer operations to new quarters at once, adding moderately to present equipment.

Anton He'eniak, formerly of Milwaukee, has organized Reliable Welding & Cutting Co. at Beaver Dam, Wis., and is equipping shop at 114 Rowell Street for acetylene and arc welding service.

Globe-Union Mfg. Co., Milwaukee, has placed contracts for erection of new branch plant costing \$100,000 at Atlanta, Ga., to obtain better distribution of storage batteries in that region. Production will begin about June 1.

Earl Bruhn and Martin Feuerstein, Neillsville, Wis., have plans by G. A. Krasin, architect, Marshfield, Wis., for new machine shop, 50 x 75 ft., one-story and basement, to be ready about May 15 or June 1.

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THE IRON AGE, April 16, 1936—105

Lincoln Avenue, Milwaukee, has started work on erection of new plant, first unit 60 x 70 ft., in West Milwaukee. Business has recently been incorporated with capital stock of \$30,000.

◀ WESTERN PA. DIST. ▶

Lovell Mfg. Co., Holland and Thirteenth Streets, Erie, Pa., manufacturer of wringers, parts and kindred mechanical products, has let general contract to Shenk Co., Erie, for second-story addition to plant unit, for expansion in foundry and spring departments. Cost close to \$45,000 with equipment.

Brumbaugh Body Co., 3031 Sixth Avenue, Altoona, Pa., manufacturer of automobile bodies and parts, is remodeling and improving building in Llysven district for new plant. Cost about \$40,000 with equipment.

Sloan & Zook Co., Main Street, Bradford, Pa., refined oil products, plans new works for oil recovery in oil field district of Venango County, including installation of pumping machinery and auxiliaries, gas engine units, air compressors, tanks and other equipment. Entire project will cost over \$500,000.

◀ SOUTH CENTRAL ▶

Swift & Co., Union Stock Yards, Chicago, have acquired property on King Street, Knoxville, Tenn., for new branch plant. Present structure will be razed at once and work started on new unit. Cost close to \$100,000 with equipment. Guy Fox is company branch manager at Knoxville. Company is also considering new branch plant at Lancaster, Ky.

Board of Education, Nashville, Tenn., plans manual training equipment in new three-story junior high school, for which bids will be asked soon on general contract. Cost over \$350,000 with equipment. Asmus & Clark, Nashville Trust Building, are architects.

Buffalo Springs Distillery, Stamping Ground, Ky., has approved plans for two-story addition, 25 x 90 ft. Cost about \$35,000 with equipment. Walter C. Wagner, Breslin Building, Louisville, is architect.

J. A. Barry Distillery Co., Ekron, Ky., has approved plans for four-story addition, 70 x 90 ft., primarily for storage and distribution. Cost over \$60,000 with equipment. Walter C. Wagner, Breslin Building, Louisville, is architect.

◀ WASHINGTON DIST. ▶

Purchasing and Contracting Officer, Fort George G. Meade, Md., asks bids until April 24 for two electric grinders, one press drill, one adjustable brake-shoe gage, one set adapter bushings, air compressor, one gasoline pump, three oil pumps, one grease and water separator, four screw wrenches, one arbor press, one welding table, gas pressure regulators, welding torch and other equipment (Circular 77).

Washington Coca-Cola Bottling Works, 406 Seventh Street, S. W., Washington, has let general contract to Davis & Platt, Inc., 6900 Fourth Street, N. W., for one-story addition. Cost close to \$100,000 with equipment. Doran S. Platt, last noted address, is architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until June 3 for water supply system at naval reservation at Alea, Oahu, T. H., including pumping machinery and accessories, electric transmission line, pipe lines, etc. (Specifications 8139).

Norfolk & Western Railway Co., Roanoke, Va., Clyde Coker, purchasing agent, asks bids until April 22 for 900-car sets cast steel side frames (Contract Serial AA-671), 900-car sets cast steel truck bolsters (Contract Serial AA-672), 2000 steel castings, including 1000 combined center and rear draft lugs, and 1000 combined stricker and front draft lugs (Contract Serial AA-673), switch stands and parts (Contract Serial AA-674).

General Purchasing Officer, Panama Canal, Washington, asks bids until April 22 for one motor-driven wood-working machine, 50,000 ft. solid copper fixture wire,

12,000 ft. insulated electric cable, 6000 lb. hard-drawn copper wire, magnet wire, five-conductor cable, magnetic switches, plug-type switches, copper wire cloth, wire rope clips, four axle straightening gages, 100 wheel aligners, switch stands and other equipment (Schedule 3137).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 21 for steel valves (Schedule 7605), seamless steel tubing (Schedule 7601), copper wire (Schedule 7554), pressure regulating valves, spare parts, and tools and wrenches (Schedule 7590), one motor-driven balancing machine (Schedule 7556) for Eastern and Western yards; until April 24, 12 electric arc welding sets (Schedule 7625) for Washington yard; one motor-driven honing machine (Schedule 7613) for Philadelphia yard.

◀ OHIO AND INDIANA ▶

Glidden Co., Berea Road and Madison Avenue, Cleveland, manufacturer of paints, oils, varnishes, etc., has plans for addition to branch plant at Jacksonville, Fla., used for rosin and allied manufacture, to triple present capacity. Installation will include new stills, vats, steel storage tanks, pumping machinery and other equipment, and new overhead traveling crane. Cost about \$100,000. McGarvey Cline is company engineer at Jacksonville.

Cincinnati Milling Machine Co., Cincinnati, has let general contract to Austin Co., Cleveland, for one-story sawtooth roof addition. Cost about \$60,000 with equipment.

Imssand Screw Products Co., 3517 Cardiff Avenue, Cincinnati, has plans for one-story machine shop addition, 39 x 50 ft. John J. Brown, 4207 Eileen Drive, is architect.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until April 21 for 10 pressure regulators for torque stand (Circular 746); until April 22, 20 oxygen regulators (Circular 735), 10 and 18-in. vernier height gages (Circular 736); until April 23, 15 manometer assemblies, incline torque stand (Circular 720), machine screws, 101 items in all, and sheet metal screws (Circular 721); until April 24, one gas cylinder hydrostatic testing equipment (Circular 744), 55 air transformers (Circular 752); until April 27, combination oil drain and dilution cock assemblies, and fuel cock assemblies (Circular 732).

Shott Mfg. Co., 1769 Elmore Street, Cincinnati, manufacturer of bed springs, etc., plans early rebuilding part of plant recently destroyed by fire. Loss close to \$50,000 with equipment.

Indianapolis Brewing Co., New York and Agnes Streets, Indianapolis, has plans for extensions and improvements, including new buildings and installation of fermenting, carbinating, bottling, case-handling, conveying, loading and other equipment. Cost about \$125,000.

◀ MICHIGAN DISTRICT ▶

Detroit Ball Bearing Co., 110 West Alexandrine Avenue, Detroit, has asked bids on general contract for two-story addition, 40 x 52 ft., in part for storage and distribution. Cost about \$30,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 21 for one landing field flood-lighting unit, mounted on trailer, with electric generating plant for Grosse Isle, Mich. (Schedule 7628).

Board of Education, Benton Harbor, Mich., has let general contract to Pierson Construction Co., Benton Harbor, for new one-story vocational school. Cost over \$60,000 with equipment. M. C. Billingham, Kalamazoo, Mich., is architect.

Standard Auto Parts, Inc., 660 Nims Street, Muskegon, Mich., has plans for one-story addition. Cost close to \$40,000 with equipment. R. Allen, 610 Lafayette Street, S. E., Grand Rapids, Mich., is architect and engineer.

Mac-Sim-Bar Paper Co., Otsego, Mich., manufacturer of paperboard products, box-board specialties, etc., has let general

contract to Henry Vanderhorst, Kalamazoo, Mich., for one-story addition and improvements in present mill. Cost close to \$45,000 with equipment.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, manufacturer of motor trailers and parts, has let general contract to Bryant & Detwiler Co., Penobscot Building, for two-story addition, 40 x 100 ft. Cost about \$40,000 with equipment.

◀ PACIFIC COAST ▶

Douglas Aircraft Co., 3000 Ocean Park Boulevard, Santa Monica, Cal., has let general contract to Harman & Co., 3044 Riverside Drive, Los Angeles, for one-story and basement addition, 300 x 300 ft. Cost over \$250,000 with machinery. Edward C. Taylor and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architect and engineer, respectively.

General Cable Co., 3600 Mines Avenue, Los Angeles, manufacturer of electrical wires and cables, has let general contract to Rainey & MacIsaac, 6624 Stanford Avenue, for one-story addition, 50 x 140 ft., primarily for storage and distribution.

Spreckels Sugar Co., 2 Pine Street, San Francisco, will have plans completed in about 60 days for initial units for new beet sugar mill at Woodland, Yolo County, Cal., with power house, machine shop and other mechanical buildings. Cost about \$1,700,000 with machinery. Harris E. Rowe is chief engineer, company address noted. C. J. Moroney is general manager.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 21 for wire brushes, bristle, expanding type, for use with motor-driven tube-cleaning outfits (Schedule 7614); until April 24, four hand-driven testing generators (Circular 7602) for Mare Island Navy Yard.

Industrial Distillers, Inc., Portland, has taken over former plant of Clayton China Co., North Winchell Avenue and Williams Street, and will remodel for production of an industrial motor fuel. Cost about \$30,000 with equipment.

California Spray-Chemical Co., Richmond, Cal., manufacturer of industrial chemicals, spray equipment, etc., has plans for new plant on 12-acre tract near city, to include pumping station and other mechanical departments. Cost about \$125,000. Stone & Webster, Russ Building, San Francisco, are engineers.

Town Council, Seward, Alaska, has revised plans for new municipal hydroelectric generating plant in Lost Lake area, with installation of one or two water turbines with generators. Project will include a transmission line to city, about 11 miles long. Initial appropriation of \$118,000 from PWA has been increased to \$166,000. Bids will be asked soon. Hubbell & Waller Engineering Corp., Seattle, is consulting engineer.

◀ FOREIGN ▶

Tata Iron & Steel Co., Ltd., Bombay India, plans new steel mill in Bengal, India, for a line of steel products not being manufactured locally at present time. New works will include a power house and other mechanical departments. Cost over \$600,000 with equipment. Indian Iron & Steel Co., Ltd., Hirapur Works, Asasul, E.I.R., and Bengal Iron Co., Ltd., Kulti, Burdwan, Bengal, both India, are expected to be interested in project and plant will then be operated as a joint enterprise.

Brisbane City Council, Tramways and Power House Department, Brisbane, Australia, asks bids until May 29 for traction line substation power equipment, including high-tension switchgear, automatic control gear, mercury arc rectifiers, switchgear, instruments, control equipment, etc.

Ontario Paper Co., Ltd., Thorold, Ont., manufacturer of newsprint, etc., plans new mill on St. Lawrence River, about 200 miles north of Quebec, where new town-site will be built. Plant will comprise several units for pulp production and finished paper division, latter to be equipped with two paper-making machines and accessory equipment. Project will include new hydroelectric power plant for mill service. Entire project will cost about \$7,500,000. Preliminary work will begin soon.